MPS 350®

Product Description
Assembly Manual

Part No. 620262B

Revised April 18, 2008

TRINITY
HIGHWAY PRODUCTS
ENERGY ABSORPTION SYSTEMS

MPS 350

Mobile Protection System

Safety, Installation, Operation, and Maintenance Manual

An NCHRP Report 350 - TL3
Truck Mounted Attenuator

Trinity Highway Products, LLC.
2525 Stemmons Freeway
Dallas, Texas 75207

!	**WARNING:** When operating this MPS 350, you must follow the safety rules. Please read these instructions before operating the MPS 350 in order to ensure the safety of the operator and any bystanders. Failure to follow this warning can result in serious injury to the operator and/or bystanders. Please keep these instructions for later use.

This Manual should be available to the operator at all times. For additional copies, contact Trinity Highway Products, LLC. at 800-527-6050.

All information, illustrations, and specifications in this Manual are based on the latest MPS 350 information available at the time of printing. We reserve the right to make changes at any time.

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THANK YOU

Thank you for placing your confidence in our highway products. Proper maintenance and careful operation will ensure maximized crash protection for many years. Please read and follow the safety instructions, warnings and recommendations contained in this MPS 350 Safety, Installation, Operation, and Maintenance Manual ("Manual"). If you have questions regarding any of this information, please do not hesitate to contact your Trinity Highway Products' representative.

To assist you with timely customer service and accurate parts replacement, please have the following information available when contacting Trinity Highway Products Customer Service.

Date of Purchase: _____ Date of Installation: _____

Installed By:_____ Date in Service: _____

Serial Number of MPS 350: _____

Serial Number of Winch: _____

The serial number of the MPS 350 is located on a foil nameplate on the Bumper Assembly. If the MPS 350 is still on the shipping container, the serial number will also be located on the front of the MPS 350.

The serial number for the Winch is on a tag opposite the black solenoid cover.

CUSTOMER SERVICE CONTACTS

Trinity Highway Products, LLC is committed to the highest level of customer service. Comments regarding the quality and workmanship of our MPS 350s, their installation procedures, supporting documentation, and performance are welcome. Our goal is to enhance highway safety through continuous improvement and innovation. More information can be obtained in the following ways:

CORPORATE CONTACTS:

Telephone:	800-644-7976 (U.S. Calls) 214-589-8140 (International Calls)
Fax:	214-589-8423
E-mail:	MPS.info@trin.net
Internet:	www.highwayguardrail.com

REGIONAL TELEPHONE CONTACTS:

Centerville, Utah	800-772-7976
Dallas, Texas	800-527-6050
Elizabethtown, Kentucky	800-282-7668
Girard, Ohio	800-321-2755
Orangeburg, South Carolina	800-835-9307
International	214-589-8140

SAFETY RULES - FOR SAFE OPERATION

*** IMPORTANT SAFETY INSTRUCTIONS ***

Always keep this Manual in a location where it is easily accessed by persons who operate or maintain the MPS 350. Additional copies of this Manual are available from Trinity Highway Products, 800-527-6050. Please contact Trinity Highway Products if you require additional Manuals or if you have any questions concerning the information in this Manual or about the MPS 350.

SAFETY SYMBOLS

This Manual describes safety symbols and pictographs that may appear on the MPS 350. Read the Manual for complete safety, assembly, operating, maintenance, repair, and service information.

SYMBOL	MEANING
	▪ **SAFETY ALERT SYMBOL** Indicates Danger, Warning or Caution. May be used in conjunction with other symbols or pictographs. Failure to read and follow the Danger, Warning, or Caution indicators could result in serious injury or death to the operator and/or bystanders.
	▪ **WARNING – READ MANUAL** Read the Manual(s) and follow all warnings and safety instructions. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

READ ALL INSTRUCTIONS BEFORE OPERATING

	IMPORTANT: READ SAFETY INSTRUCTIONS THOROUGHLY AND FOLLOW THE SAFE OPERATION PRACTICES BEFORE OPERATING THE MPS 350. Failure to follow this warning can result in serious injury or death to the operator and/or bystanders.	
	DANGER: Do not operate the MPS 350 near overhead power lines. If the MPS 350 comes into contact or close proximity with a power line or there is arcing, **STAY** in the truck cab. Keep away from any metal parts on the MPS 350. Do not let anyone get close to the truck. Do not attempt to jump from the truck. The Power Company must disconnect the power before you can leave the cab. Know the overhead clearance of overhead obstructions. **NEVER** drive the MPS 350 under any overhead obstruction without knowing the clearance height. Failure to follow this warning could cause damage to the MPS 350 and may result in serious personal injury or death.	
	WARNING: NEVER ATTEMPT TO MANUALLY RAISE THE FRAME ASSEMBLY OF THE MPS 350. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.	
	WARNING: Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.	

	WARNING: The MPS 350 must be lowered completely until the Frame Assembly's weight rest on the Support Chains. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	WARNING: Keep clear of the MPS 350 while in operation. Do not sit or stand near, under or behind MPS 350 while lowering or raising the MPS 350. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	WARNING: Ensure that all fasteners are secure. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	WARNING: Ensure that the winch strap is tight and without any slack before releasing the Latch Bar Assembly. **NEVER RELEASE THE LATCH BAR ASSEMBLY IF THE WINCH STRAP IS SLACK**. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	WARNING: Ensure that no one is near, under or behind the MPS 350 when in operation. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	WARNING: Do not operate the MPS 350 while wearing loose fitting clothing, which may become tangled in the MPS 350 during operation. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	WARNING: Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	CAUTION: Failure to ensure proper function of the Limit Switch may result in failure of the Winch.
	CAUTION: Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.
	CAUTION: When traveling to and from a work zone, travel with the MPS 350 in the Up (Traveling) Position.
	CAUTION: While traveling in a moving work zone, NEVER drive faster than 35 mph (55 km/hr) with MPS 350 in a Down (Operating) Position. Speeds slower than 35 mph (55 km/hr) may be required if bouncing of the MPS 350 occurs.
	CAUTION: Prior to mounting the MPS 350, verify that the fuel tank(s) on the truck is more than 10 feet 6 inches (3200 mm) from the rear of the truck. If the distance is less than 10 feet 6 inches (3200 mm) contact your Trinity Highway Products Representative about various extensions.

⚠	**CAUTION:** Leave adequate (4" minimum) clear area directly behind the Bumper Assembly and directly in front of the Shear Bars to ensure that the Shear Bars are not obstructed during an impact. Failure to follow this warning will result in damage to the truck and the MPS 350. See drawing 33599/SS621 located in the Appendix for more information.
⚠	**CAUTION:** Do not leave the Winch Strap tight in the Down (Operating) Position, while the MPS 350 is being used, the Winch and the attachment point to the Frame Assembly could be damaged.
⚠	**CAUTION:** The Winch Strap on the MPS 350 should **ALWAYS** wrap over the top of the Winch Drum to ensure proper function of Winch. (See Figure 24.3)

General Warnings and Cautions

⚠	**WARNING:** When installing, repairing, maintaining, operating, or adjusting this MPS 350, you must follow the safety rules. Please read these instructions before operating the MPS 350 in order to ensure the safety of the operator and any bystanders. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders. Please keep these instructions for later use.	📖

- Read the instructions carefully. Be familiar with the controls and proper use of the MPS 350 before installing, repairing, servicing maintaining, operating, or adjusting your MPS 350.
- Those who use and maintain this MPS 350 must be thoroughly trained and familiar with the MPS 350. If used incorrectly or maintained improperly, this MPS 350 could cause severe injury or death to the operator and/or bystanders.
- Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning can result in serious injury or death to the operator and/or bystanders.
- Use only approved Trinity Highway Products replacement Shear Bolts when repairing MPS 350 after a crash or any shearing of the Shear Bolts. (See the following section for details: "*When the MPS 350 is Hit*")
- Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of Frame when in operation and during maintenance activities.
- Do not operate or service this MPS 350 when tired, ill, or under the influence of alcohol, drugs, or medication.
- Do not operate or service this MPS 350 until you have read this Manual thoroughly. Please call Trinity Highway Products at 800-527-6050 if you require assistance.
- In addition to this Manual, follow all instructions on Safety Warning Labels attached to the MPS 350.
- Do NOT operate MPS 350 if any of the Warning Decals are covered by road debris or are otherwise illegible.

Installation, Repair, Servicing, and Maintenance Warnings and Cautions

⚠	**CAUTION:** Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.

- Attach only Trinity Highway Products approved equipment to your MPS 350. The installation of unauthorized accessories could cause undesired results during an impact.
- Contact Trinity Highway Products before modifying the MPS 350 in any way.
- Some of the service operations may require special tools or equipment. Please contact Trinity Highway Products at 800-527-6050 before attempting these installs, repairs, services, maintenances, operations, and/or adjustments.
- Anytime you will be working on this MPS 350 or its related systems, you must do the following:
    - Inform the truck driver that the MPS 350 is going to be repaired or serviced, block the wheels to ensure that the truck does not move, and do not start the truck.
    - Remove the keys from the ignition of the truck.
    - Place signs on the truck that it is being serviced – DO NOT START ENGINE.
    - Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of Frame when in operation and during installation, repair, service, adjustment, or maintenance activities.
- Do not install the MPS 350 on the truck if the truck's fuel tank is less than 10 feet 6 inches (3200 mm) from the rear of the truck. Consult Trinity Highway Products for a bumper extension to get the correct spacing.
- The truck must be loaded to the correct weight before the MPS 350 is installed. The minimum loaded weight is 15,000 pounds (6,815 kg). This could be different for local regulations. Consult your local governing specifications.
- Use only approved Trinity Highway Products replacement Shear Bolts when repairing MPS 350 after a crash. (See the following section for details: "*When the MPS 350 is Hit*")
- Use only Rip Plates from Trinity Highway Products to replace damaged ones in case of an impact**.**
- Make sure the Bumper of the MPS 350 is braced as shown in this Manual. See Figure 9.0.

Operation Warnings and Cautions

⚠	**DANGER:** Do not operate the MPS 350 near overhead power lines. If the MPS 350 comes into contact or close proximity with a power line or there is arcing, **STAY** in the truck cab. Keep away from any metal parts on the MPS 350. Do not let anyone get close to the truck. Do not attempt to jump from the truck. The Power Company must disconnect the power before you can leave the cab. Know the overhead clearance of overhead obstructions. Never drive the MPS 350 under any overhead obstruction without knowing the clearance height. Failure to follow this warning could cause damage to the MPS 350 and may result in serious personal injury or death.
⚠	**CAUTION:** When traveling to and from a work zone, travel with the MPS 350 in the Up (Traveling) Position.

⚠	**CAUTION:** While traveling in a moving work zone, **NEVER** drive faster than 35 mph (55 km/hr) with MPS 350 in a Down (Operating) Position. Speeds slower than 35 mph (55 km/hr) may be required if bouncing of the MPS 350 occurs.

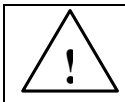
- Keep clear of MPS 350 when in operation. Do not sit or stand near, under or behind the MPS 350 while lowering or raising the MPS 350.
- Maintain safe distance from the MPS 350 when being raised or lowered.
- Do not operate the MPS 350 while wearing loose fitting clothing, which may become tangled in the MPS 350 during operation.
- Do not use the MPS 350 to carry any loads at anytime.
- Do not use the MPS 350 to lift things.
- The MPS 350 is not a ladder or stool to stand or sit on at anytime.
- Ensure that the Winch Strap is tight and without any slack before releasing the Latch Bar Assembly. DO NOT ATTEMPT TO RELEASE THE LATCH BAR ASSEMBLY IF THE WINCH STRAP IS SLACK.
- Use only the Winch to raise and lower the MPS 350 Frame Assembly. DO NOT ATTEMPT TO MANUALLY RAISE THE FRAME ASSEMBLY OF THE MPS 350.
- Do not operate the MPS 350 with a cut, torn, or frayed Winch Strap. Any damage will reduce the capacity of the Winch Strap. Replace the damaged Winch Strap.
- Do not operate the MPS 350 with frayed, damaged or broken wiring. The wiring could cause the electrical system to short circuit and damage the MPS 350 or Truck.
- Allow the Chain Assemblies to support the complete weight of the Frame Assembly when in the Down (Operating) Position. (See Figure 17.0) The Winch Strap should not carry or support any of the Frame Assembly weight in the Down (Operating) Position. (See Figure 17.0)
- Make sure that all lights work on MPS 350 before leaving the yard.
- Make sure that the Limit Switch, located on the Latch Bar Assembly, is operating properly prior to leaving the yard. This Limit Switch cuts off power to the Winch Motor while the MPS 350 is in the Up (Traveling) Position. (See Figure 18.0)
- Make sure the Latch Bar Assembly operates correctly. The Latch Bar Arm must connect and engage the Frame Crossmember and allow the Limit Switch to shut off the Winch.
- Make sure the height of the Impact Fence is adjusted correctly on level ground. The 12” –14” (305 mm – 355 mm) height can be obtained by adjusting the Turnbuckles in the Chain Assemblies.
- In addition to this Manual, follow all instructions on Safety Warning Labels attached to the MPS 350.
- Do NOT operate MPS 350 if any of the Warning Decals are covered in road debris or are otherwise illegible.

GENERAL INFORMATION

MPS 350 SPECIFICATIONS

The MPS 350 is a Test Level 3 crash cushion that meets performance guidelines established in National Cooperative Highway Research Program Report 350. The MPS 350 has passed **ALL OF THE REQUIRED AND OPTIONAL TESTS** described in NCHRP Report 350.

The MPS 350 mounts to trucks with a minimum gross weight of 15,000 pounds (6,815 kg). Installers and operators should consult local standards and specifications for other applicable guidelines regarding trucks, delineation, and usage.



CAUTION: The MPS 350 may be used in stationary and moving work zones. Trucks should be equipped with headrests and proper restraints for occupant safety.

Weight and Dimensions:				
Weight:				
	Installed		~ 1,600 pounds	727 kg
	Shipping		1,876 pounds	853 kg
Length:				
	Down (Operating) Position		13 feet 8 inches	4.20 m
	Up (Traveling) Position		3 feet 2 inches	0.97 m
Width:				
	With Plastic Nose/Sideboards		6 feet	1.83 m
	Without Plastic Nose/Sideboards		5 feet 9 inches	1.75 m
Height:				
	Down (Operating) Position			
		At the Controls	45 inches	1.14 m
		At the Nose	33 inches	0.84 m
	Up (Traveling) Position		12 feet 6 inches	3.81 m

IMPORTANT: READ SAFETY INSTRUCTIONS THOROUGHLY AND FOLLOW THE SAFE OPERATION PRACTICES BEFORE OPERATING THE MPS 350. Failure to follow this warning can result in serious injury or death to the operator and/or bystanders.

WARNING: Keep clear of the MPS 350 while in operation. Do not sit or stand near, under or behind MPS 350 while lowering or raising the MPS 350. Failure to follow this warning can result in serious injury or death to the operator and/or bystanders.

KNOW YOUR MPS 350

ORIENTATION CONVENTIONS

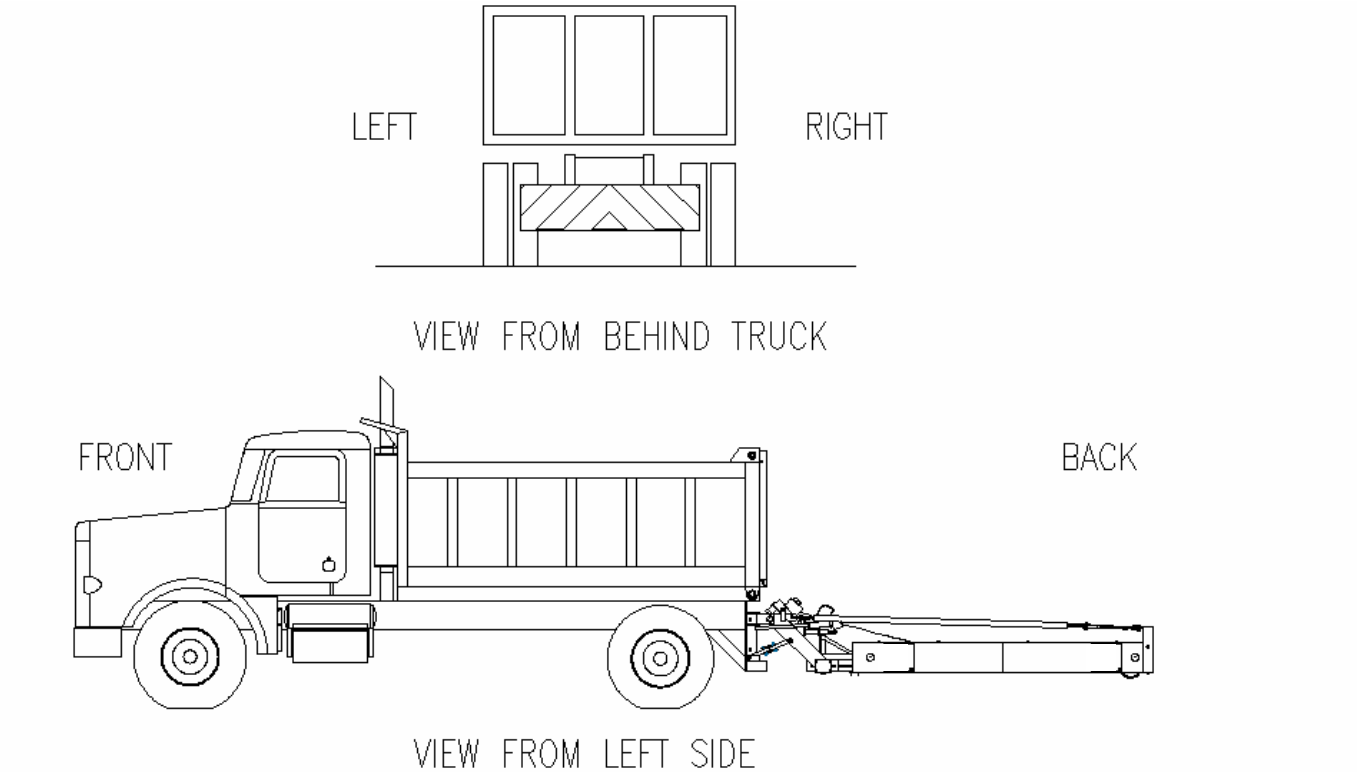


Figure 1.0 MPS-350 in Down (Operating) Position

PART NAME REFERENCE

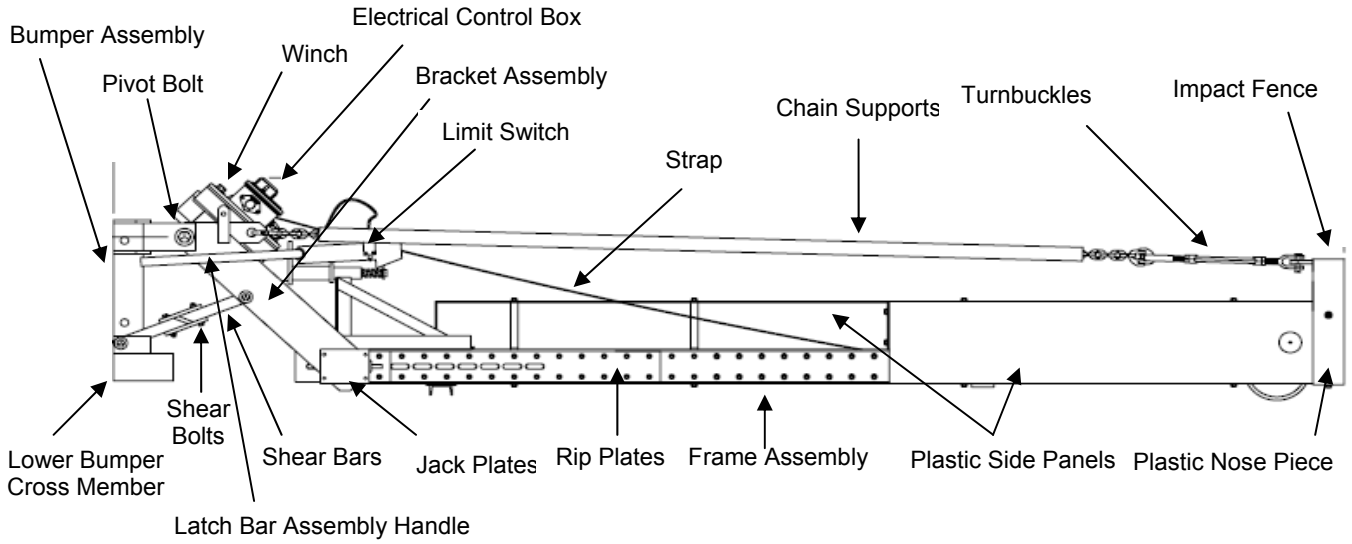


Figure 2.0 MPS-350 Major Components Identification

SHIPPED - LOOSE PARTS LIST

Part Number 33785B
Rev. B
Dated: 23 June, 2002
Revised: 11 January, 2007

Only **APPROVED** Trinity Highway Products replacement parts are allowed.

Item	Quantity	Description	Part Number	Shipped	By:
	Required				
1	1	Winch Manual	NPN		
2	73	Washer, Flat, 3/8" (10 mm)	3051B		
3	4	Bolt, HH, 3/8" x 3 1/2" (10 mm x 90 mm)	6078B		
4	73	Bolt, HH, 3/8" x 1" (10 mm x 25 mm)	3217G		
5	73	Nut, Whiz, 3/8" (10 mm)	3257G		
6	1	Pin, Cotter, 3/16" x 2" (5 mm x 50 mm)	5390G		
7	1	Pin, Clevis,1" x 8" (25 mm x 200 mm)	5628G		
8	1	Light Harness Kit	5677B		
9	3	Jacks, Storage	5678B		
10	1	Plastic Nose Piece	6081B		
11	4	Plastic Sideboard Assembly	6190B		
12	1	Plastic Bottom Sheet	6080B		
13	8	Bottom Sideboard Strap	7410B		
14	8	Top Sideboard Strap	7411B		
15	4	Brace, Channel, C4 (C100)	7417B		
16	4	Rip Plate, 3/16" x 9" (5 mm x 225 mm)	7468G		
17	2	Rip Plate, 16 Gauge x 45" (1145 mm)	7469G		
18	2	Rip Plate, 16 Gauge x 9" (225 mm)	7472G		
19	2	Rip Plate, 16 Gauge x 21" (535 mm)	7473G		
20	1	Pallet or Crate	NPN		
21	1	Box	6517B		
22	1	Box Liner	6518B		
23	1	Bolt, HH, 3/8” x 4-1/2” (10 mm x 115 mm)	6323G		
Checked by:			Date:		

RECOMMENDED SPARE PARTS LIST

The recommended spare parts list is a general listing of parts for your MPS 350. Your Trinity Highway Products Representative is ready to assist you in determining your specific needs and getting you the parts to keep your MPS 350 running.

Only **APPROVED** Trinity Highway Products replacement parts are allowed.

Item	Quantity	Description	Part Number
1	1	Rip Plate Repair Kit, Consisting of the following:	7412B
2	4	Shear Bolt	6078G
3	4	Shear Bolt Nut	3257A
4	4	Rip Plate, 3/16” x 9” long (5 mm x 225 mm)	7468G
5	2	Rip Plate, 16 Gauge x 45” long (1145 mm)	7469G
6	2	Rip Plate, 16 Gauge x 9” long (225 mm)	7472G
7	2	Rip Plate, 16 Gauge x 21” long (535 mm)	7473G
8	2	Side Board Segment, Complete (Makes One Side)	6190B
9	1	Nose Piece, Black w/ Yellow Reflective	6081B
10	1	Nose Piece, Red w/ White Reflective	6811B
11	1	Plastic Bottom Sheet, Black w/ Yellow Reflective	6080B
12	1	Plastic Bottom Sheet, Red w/ White Reflective	6812B
13	1	Winch Strap	5637B
14	1	Jack Assembly	5678B
15	4	Shear Bolt	6078G
16	4	Shear Bolt Nut	3257A
17	2	Light Assembly, S/T/T	6083B
18	2	S/T/T Light Assembly, Grommet	6084B
19	1	Light Assembly, Marker	6086B
20	1	Marker Light Assembly, Grommet	6087B
21	2	Frame Retainer Plates	7409B
22	1	Harness, Roadside, S/T/T	6037B
23	1	Harness, Curbside, S/T/T	6038B
24	1	Harness, Marker Lamps	6039B
25	1	Shear Bar Reset Fixture	33779B
26			
27			
28			
29			
30			
31			

NOTE: For Items 9, 10, 11, and 12, pick one of each Plastic Nose Piece and Plastic Bottom Sheet based on local color requirements.

MPS 350 INSTALLATION INSTRUCTIONS

RECOMMENDED TOOL LIST

The following list shows recommended tools for installation of the MPS 350:

Welding Equipment
Cutting Torch
Hammers
Alignment Tool or Drift Punch, Minimum 12” (305 mm) long
Tape Measure
Marking Pens
Impact Wrench, ½” drive
Various Impact Sockets
Various Open End Wrenches
Drill Motor and Bits
Floor Jack or Forklift

RECEIPT AND INSTALLATION INSTRUCTIONS

The following steps will allow you to complete the MPS 350 installation instructions:

	IMPORTANT: READ SAFETY INSTRUCTIONS THOROUGHLY AND FOLLOW THE SAFE OPERATION PRACTICES BEFORE OPERATING THE MPS 350. Failure to follow this warning can result in serious injury or death to the operator and/or bystanders.
	WARNING: Keep clear of the MPS 350 while in operation. Do not sit or stand near, under or behind MPS 350 while lowering or raising the MPS 350. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
	CAUTION: Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.

Step	Actions
1	Read safety instructions thoroughly before operating the MPS 350.
2	Remove the shipping bands and protective material. Dispose of all shipping materials.

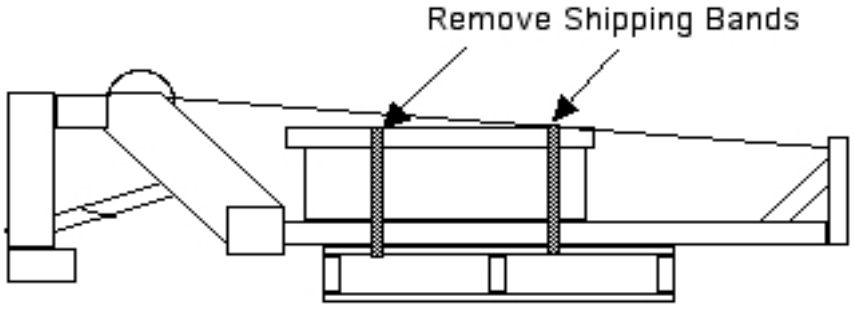
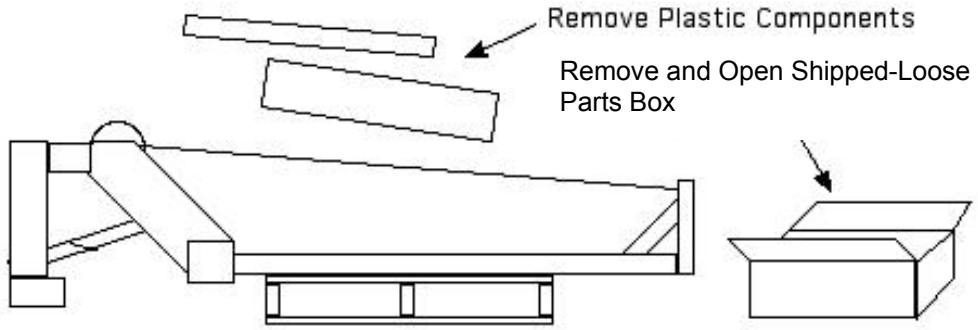
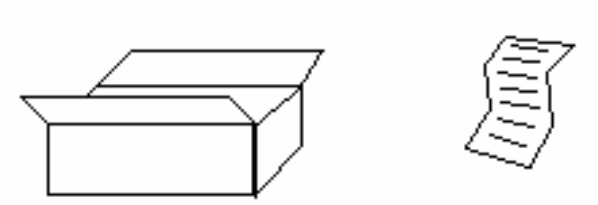
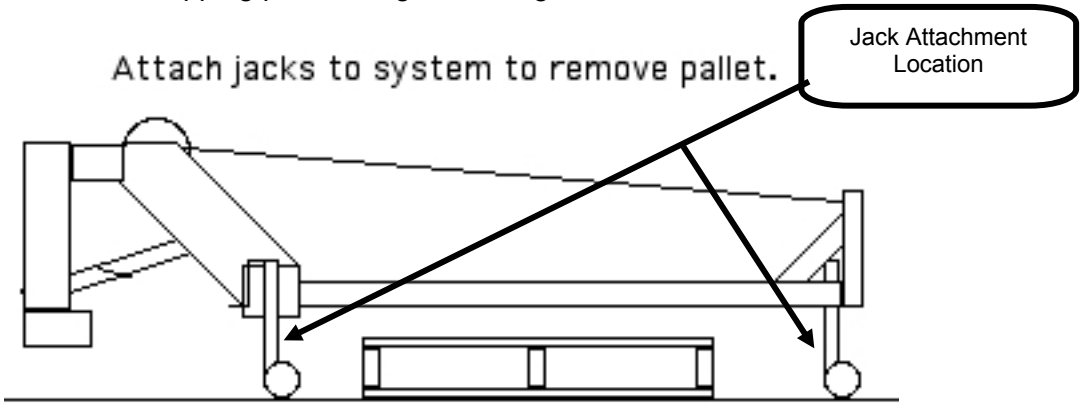
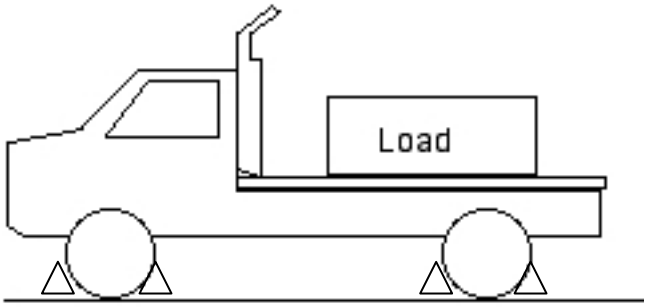
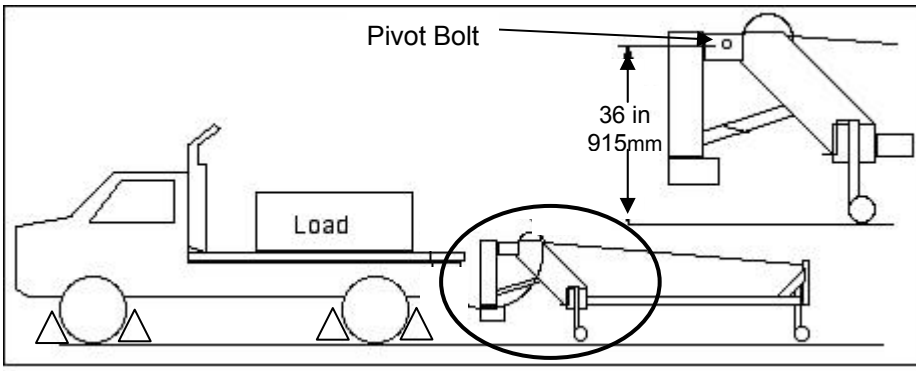


Figure 3.0 Shipping Band Removal

3	Remove plastic components (Plastic Nose Piece, Plastic Sideboards, and Plastic Bottom Sheet) and cardboard box with the Shipped-Loose Parts.  Figure 4.0 Plastic Components and Shipped-Loose Parts Removal
4	Open the Shipped-Loose Parts box and inventory items from the Shipped-Loose List, Part Number 33785B. (See page 9, Shipped – Loose Parts List) Contact Trinity Highway Products if parts are missing.  Figure 5.0 Inventory Items From Shipped-Loose Parts Box
5	Attach the three Jacks (Part Number 5678B, item #9 on Packing List) with 4 each 3217g – 3/8" x 1" Hex Bolts and 4 each 3257g – 3/8" Whiz Nuts found in the Shipped-Loose Hardware Bag. Drawing 5678B in the Appendix references all the parts. Lift the MPS 350 off the shipping pallet using the storage Jacks.  Figure 6.0 Jack Attachment Location

6	Confirm the truck is on a flat level ground.
7	Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels to ensure that the truck does not move, and do not start the truck. (See Figure 7.0) Remove the keys from the ignition of the truck. Place signs on the truck that it is being serviced – DO NOT START ENGINE.
8	Add load to the truck. The truck must be loaded to the correct weight before the MPS 350 is installed. The minimum loaded weight is 15,000 pounds (6,815 kg). This could be different for local regulations. Consult your local governing specifications.  Figure 7.0 Add Load to Truck to Achieve Correct Weight
9	Move the MPS 350 into position at the back of the truck. Use the Jacks to set the correct installed height at 36 inches (915 mm) to the center of the Pivot Bolt. **36 inches**, plus ½" minus 0 (915 mm plus 12 mm minus 0 mm), (minimum height of 36" (915m) and maximum height of 36-1/2" (927mm)) must be maintained to allow correct operation of the MPS 350 during a crash.  Figure 8.0 Position MPS 350 for Attachment to Truck

10 Select the best mounting option for your application.

NOTE: All welding should conform to American Welding Standard D1.1 welding procedures.

CAUTION: Prior to mounting the MPS 350, verify that the fuel tank(s) on the truck is more than 10 feet 6 inches (3200 mm) from the rear of the truck. If the distance is less than 10 feet 6 inches (3200 mm) contact your Trinity Highway Products Representative about various extensions.

Option A

This option uses a ½" (12 mm) plate welded across the back of the truck frame rails as shown in Figure 9.0 below. Mount Tabs welded to the plate provide attachment points for the MPS 350 Bumper. The length of the Mount Tabs should allow ½" (12 mm) of clearance between the Lower Bumper Cross Member of the MPS 350 Bumper and the Mounting Plate. The Mounting Plate should be braced to the truck frame using the "C" Channels provided with the MPS 350. Attach the Channels to the truck frame as far forward as possible following the truck manufacturer's recommendations regarding attachment methods.

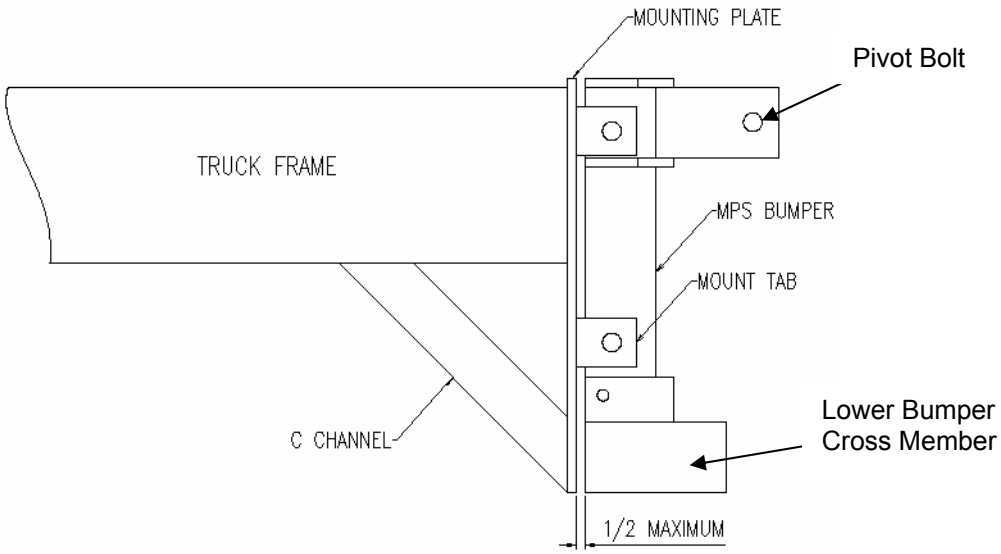


Figure 9.0 Truck Mounting Plate and MPS 350 Bumper Assembly

Option B

This option involves welding the MPS 350 Bumper directly to the truck frame rails. Welding on the "C" Channels provided can extend the rails. Adequate bracing should be welded to the Lower Bumper Cross Member extending forward as far as possible for attachment to the truck frame rails.

CAUTION: Leave adequate (4" minimum) clear area directly behind the Bumper Assembly and directly in front of the Shear Bars to ensure that the Shear Bars are not obstructed during an impact. Failure to follow this warning will result in damage to the truck and the MPS 350. See drawing 33599/SS-621 located in the Appendix for more information.

Contact your Trinity Highway Products Representative to discuss any special mounting requirements for your particular application.

11

After the MPS 350 is mounted to the truck, adjust the Impact Fence height using the Turnbuckles. The gap should measure between 12 to 14 inches (305 mm to 355 mm). This measurement is from the ground to the bottom edge of the Impact Fence. Remove and store Jacks for later use. (See Figure 25.0, Operating Height)

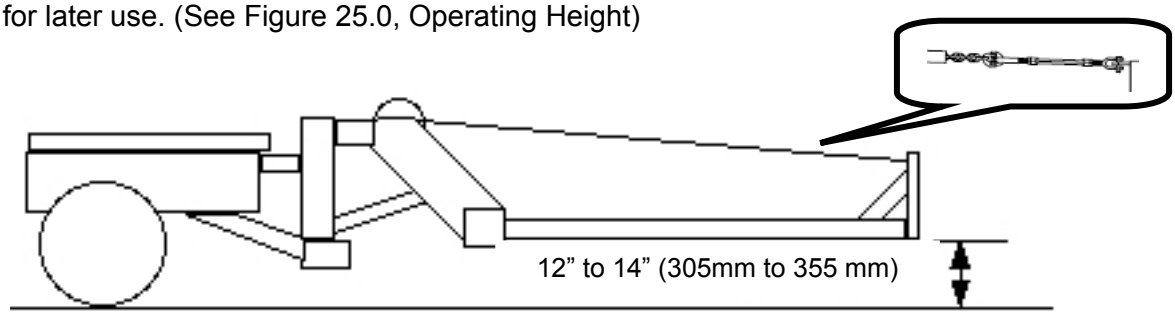


Figure 10.0 Adjust MPS 350 to Proper Operating Height

12

Connect the Winch by routing a 1/0 cable from the truck battery to the back of the truck. (See Appendix Drawing 7555) The use of a welding cable quick-disconnect will allow easy connection and removal of the MPS 350 from the truck as required; which also allows for easy routing of the cable. Confirm operation of the Winch and Controls.

13

Push and hold the Controller Switch’s DOWN button while holding the 1” (25 mm) diameter Pin. Un-spool the Winch Strap until it is long enough to attach to the Cross Frame. Remove the 1” (25 mm) diameter Pin from the Winch Strap. Position the Winch Strap between the two Cross Bar Tabs. Thread the 1” (25 mm) diameter Pin through the Cross Bar Tabs and the loop on the end of the Winch Strap. Secure by inserting the Cotter Pin into the hole in the 1” (25 mm) diameter Pin and flaring out the ends of the cotter pin. A Cotter Pin is supplied in the Shipped-Loose parts bag.

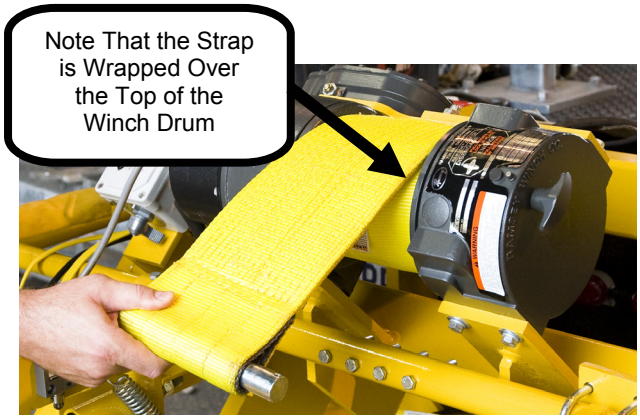


Figure 11.0 Press DOWN button to Release Strap

Figure 11.1 Straps Released to Cross Frame

Figure 11.2 Position Strap and Insert 1” (25 mm) Pin

Figure 11.3 Insert Cotter Pin and Secure

14 Complete the following two steps:

1 Mount the Light System on the MPS 350. Use the Drawing 7481 located in the Appendix for identification and placement of parts.

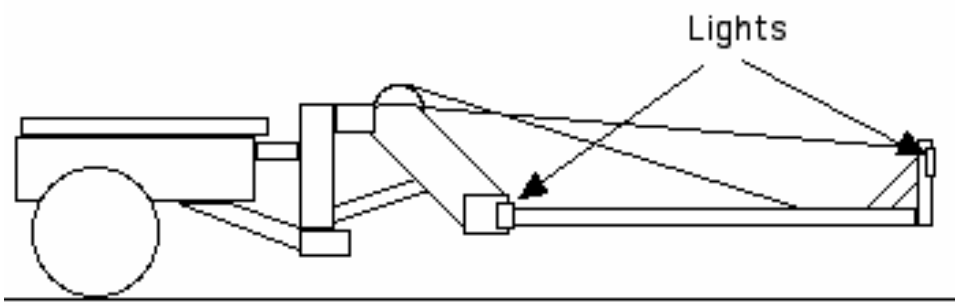


Figure 12.0 Lights Location

2 Mount the Junction box on the Lower Bumper Cross Member of the Bumper Assembly.

The following chart references the wiring color code and function for the connector wiring.

Wire Color and Function	
Wire Color	**Function**
White	Ground
Black	Tail, Clearance, and ID Lamps
Yellow	Left Hand Turn and Hazard
Red	Stop Lamp and Antilock
Green	Right Hand Turn and Hazard
Brown	Tail, Clearance, and ID Lamps

15 Complete the following nine steps:

1 Assemble two Plastic Sideboards to make a Plastic Sideboard Assembly. Assembly Hardware 3217B - 3/8”x 1” Hex Bolts, 3257B - 3/8” Whiz Nuts and 3051B - 3/8” Flat Washers is in the Shipped-Loose package.

2 Install the upper and lower Sideboard Hangers to the frame. Use the Drawing 7487 located in the Appendix to reference the correct positioning of the Hangers.

3 Hang the Plastic Nose Piece on the Impact Fence first.

4 Insert the hardware 3217B - 3/8”x 1” Hex Bolts, 3257B - 3/8” Whiz Nuts and 3051B - 3/8” Flat Washers in the top holes. Do not tighten them yet.

5 Slip the Plastic Sideboards inside the outer edges of the Plastic Nose Piece. The Plastic Sideboard and Plastic Nose Piece bolt together in two places as shown in Drawing 7487 in the Appendix.

6 Insert the hardware 3217B - 3/8”x 1” Hex Bolts, 3257B - 3/8” Whiz Nuts and 3051B - 3/8” Flat Washers in the bottom holes of the Plastic Nose Piece.

7 Match drill the Plastic Sideboards using the Hangers as a guide. Hardware 3217B - 3/8”x 1” Hex Bolts, 3257B - 3/8” Whiz Nuts and 3051B - 3/8” Flat Washers to mount the Plastic Sideboards is in the Ship-Loose package.

8	Be sure to install the 3051B - 3/8” Flat Washers where 3217B - 3/8”x 1” Hex Bolts and 3257B - 3/8” Whiz Nuts contact the plastic components (Plastic Nose, Plastic Sideboard, and Plastic Bottom Sheet) as shown in Drawing 7487 in the Appendix.
9	Tighten all 3217B - 3/8”x 1” Hex Bolts and 3257B - 3/8” Whiz Nuts.

Plastic Sideboards and Plastic Nose Piece

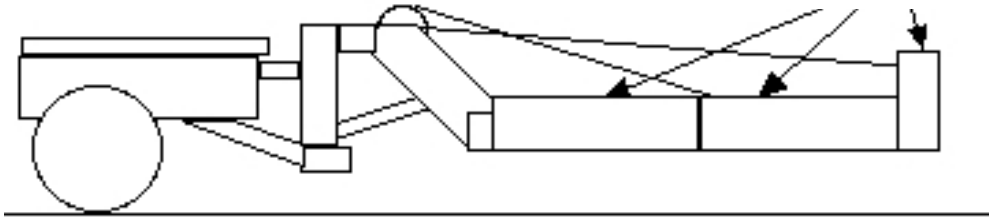


Figure 13.0 Plastic Sideboards and Plastic Nose Piece Installation

16 Raise the MPS 350 to the Up position until the Latch Bar Arms drop into place over the Frame Crossmenber on the Frame Assembly. The Latch Bar Arms must connect and engage the Frame Crossmember and allow the Limit Switch to shut-off the Winch. (See the following section: Raising The MPS 350)

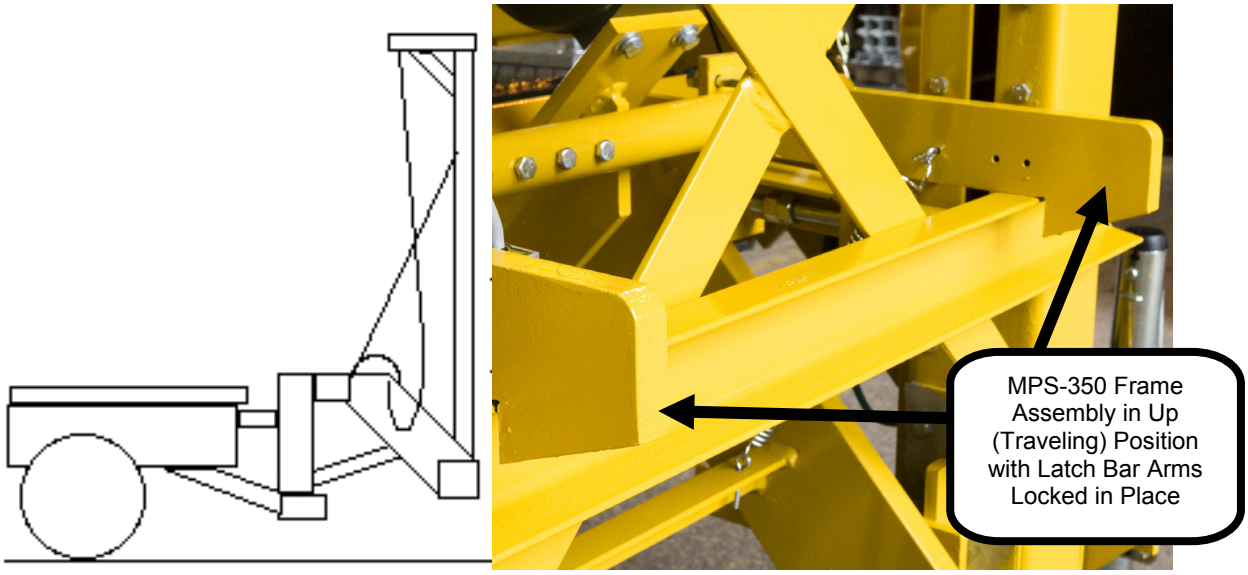


Figure 14.0 MPS 350 in Up (Traveling) Position with Latch Bar Arms in Locked Position

WARNING: Keep clear of the MPS 350 while in operation. Do not sit or stand near, under or behind MPS 350 while lowering or raising the MPS 350. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

17	With the MPS 350 in an Up (Traveling) Position, remove the Linchpin and open the Clip on the end. (See Figure 15.0 Below)
18	Insert the Chain between the Chain Retainer Tabs. Next, insert the Linchpin through the Chain Retainer Tabs and Chain. Lock the Clip on the end to secure in place. (See Figure 15.0 Above) **NOTE**: Later models of the MPS 350 may be equipped with Protective Chain Covers that do not allow the Linchpins to restrain the Chains as shown in the Chain Retainer figure. In this case, the protective covers may be cut in two at the appropriate location to allow the insertion of the Linchpin.
19	Repeat the Steps 16 and Step 17 above for the second Chain.
20	Center the Plastic Bottom Sheet between the lower “X” braces and match drill holes. Match drill holes of the Plastic Sideboard Flanges in two places on both sides. Use 3217B - 3/8”x 1” Hex Bolts, 3257B - 3/8” Whiz Nuts and 3051B - 3/8” Flat Washers to bolt the Plastic Bottom Sheets to the Plastic Sideboard Flanges.

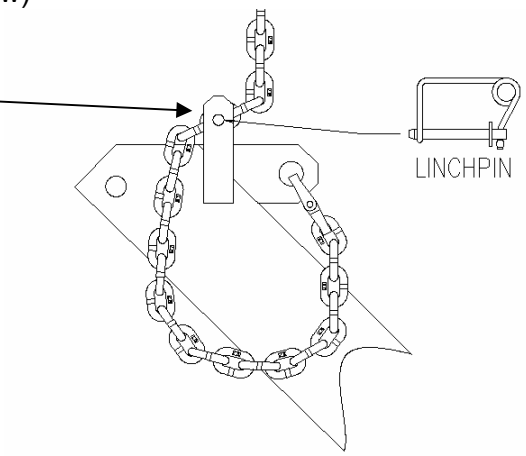


Figure 15.0 MPS 350 Chain Retainer

Figure 16.0 Plastic Bottom Sheet Installation

OPERATION GUIDELINES

*** IMPORTANT OPERATION INSTRUCTIONS ***

Always keep the Manual in a location where it is easily accessed by persons who operate or maintain the MPS 350. Additional copies of this Manual are available from Trinity Highway Products, 800-527-6050. Please contact Trinity Highway Products if you require additional Manuals or if you have any questions concerning the information in the Manual or about the MPS 350.

Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning can result in serious injury or death to the operator and/or bystanders.

PREVENTATIVE MAINTENANCE

WINCH Refer to the Winch Manual for specific guidelines on operation and maintenance. (The Winch Manual is included in the Shipped-Loose Parts bag.)	
DAILY	Check operation of Limit Switch and Latch Bar Assembly. Visually inspect MPS 350 for loose Bolts, damaged parts, etc. Check for 12" - 14" (305 mm – 355 mm) of ground clearance under Nose. Adjust if necessary. Inspect Turnbuckles to ensure that Lock Nuts are tight. Check Light System for correct operation. Inspect Winch Strap and hardware for damage.
WEEKLY	Visually inspect Support Strut 3/8" (10 mm) Shear Bolts. Inspect the Support Strut Mounting Bolts. Inspect operation of the Latch Bar Assembly and Springs. Inspect Chain Assembly for damage.
MONTHLY	Inspect demarcation markings on Nose of MPS 350. Inspect Caution and Warning decals. Call Trinity Highway Products for replacements. Inspect Frame Retainer Straps to ensure that Bolts are tight and Winch Strap is undamaged. Inspect Electrical Wiring and Plugs. Inspect Plastic Sideboards and connection hardware. Inspect Rip Plates and attachment hardware. Inspect Winch Strap Attachment Plate and Bolts by unwinding the Winch until the Bolts are visible. Check for stretching of holes in Winch Strap past Retainer Plate.
THREE MONTHS	**Replace** 3/8" (10 mm) Shear Bolts in Support Struts with approved Bolts. See Drawing 33599/55621 for details of Shear Bolt replacement. Ensure that all Fasteners are secure. If the MPS 350 is transported daily/weekly, inspect the Shear Bolts and replace if needed.
YEARLY	**Replace** 5/8" (16 mm) Shear Bar Mounting Bolts on the Bracket and Bumper with approved Bolts. See Drawing 33599/SS621 for details of Shear Bolt replacement. Ensure that all fasteners are secure.
NOTE:	Replacement of 3/8" (10 mm) Shear Bolts should be done more often if MPS 350 is subjected to excessive bouncing during operations.
NOTE:	Replacement of 5/8" (16 mm) Shear Bar Mount Bolts should be done more often if MPS 350 is subjected to excessive bouncing during operations.

WARNING: Ensure that all fasteners are secure. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

MPS 350 FUNCTIONS AND FEATURES

⚠	**CAUTION:** When traveling to and from a work zone, travel with the MPS 350 in the Up (Traveling) Position.
⚠	**CAUTION:** While traveling in a moving work zone, **NEVER** drive faster than 35 mph (55 km/hr) with MPS 350 in a Down (Operating) Position. Speeds slower than 35 mph (55 km/hr) may be required if bouncing of the MPS 350 occurs.

Figure 17.0 MPS 350 in Down (Operating) Position

Figure 18.0 MPS 350 in Up (Traveling) Position

WINCH SYSTEM OPERATION

The MPS 350 must be raised and lowered using the Winch.

⚠	**DANGER:** Do not operate the MPS 350 near overhead power lines. If the MPS 350 comes into contact or close proximity with a power line or there is arcing, **STAY** in the truck cab. Keep away from any metal parts on the MPS 350. Do not let anyone get close to the truck. Do not attempt to jump from the truck. The Power Company must disconnect the power before you can leave the cab. Know the overhead clearance of overhead obstructions. **NEVER** drive the MPS 350 under any overhead obstruction without knowing the clearance height. Failure to follow this warning could cause damage to the MPS 350 and may result in serious personal injury or death.
⚠	**WARNING: NEVER** ATTEMPT TO MANUALLY RAISE THE FRAME ASSEMBLY OF THE MPS 350. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

A Control Box is located near the front of the MPS 350. The Control Box provides a Power Cut-off Switch, a toggle switch for UP and DOWN operation, and a receptacle for attaching an UP and DOWN Control Pendant. (See Figure 19.0 Below.)

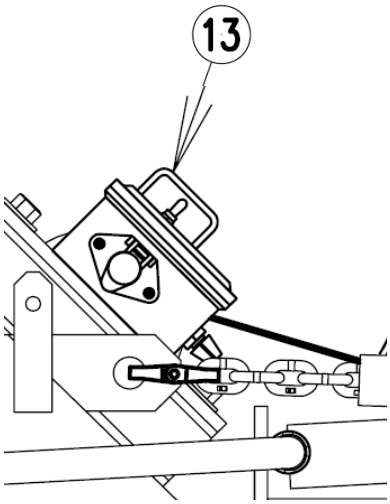


Figure 19.0 MPS 350 Electrical Control Box and Power Shutoff Switch (Item 13 of Appendix Drawing 959/SS-298)

The Control Pendant allows the operator to maintain additional safe distance from the MPS 350 when raising or lowering. (See Figure 20.0 Below.)

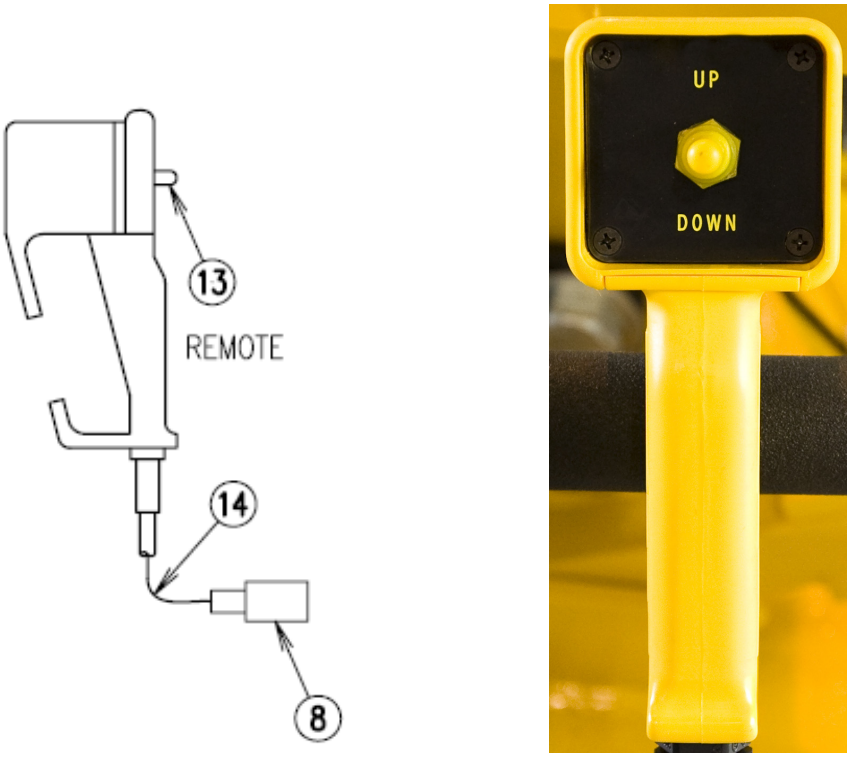


Figure 20.0 MPS 350 Remote Control Pendant (Items 8, 13 and 14 of Appendix Drawing 7555)

When the Frame Assembly is securely locked in the Up (Traveling) Position, the Limit Switch is depressed by the Frame Crossmember, power to the Winch is cut off, and the Winch will not work. In order to provide power to the Winch, the Latch Bar Assembly Handle must be pushed downward, which raises the Latch Bar Arms and releases pressure on the Limit Switch.

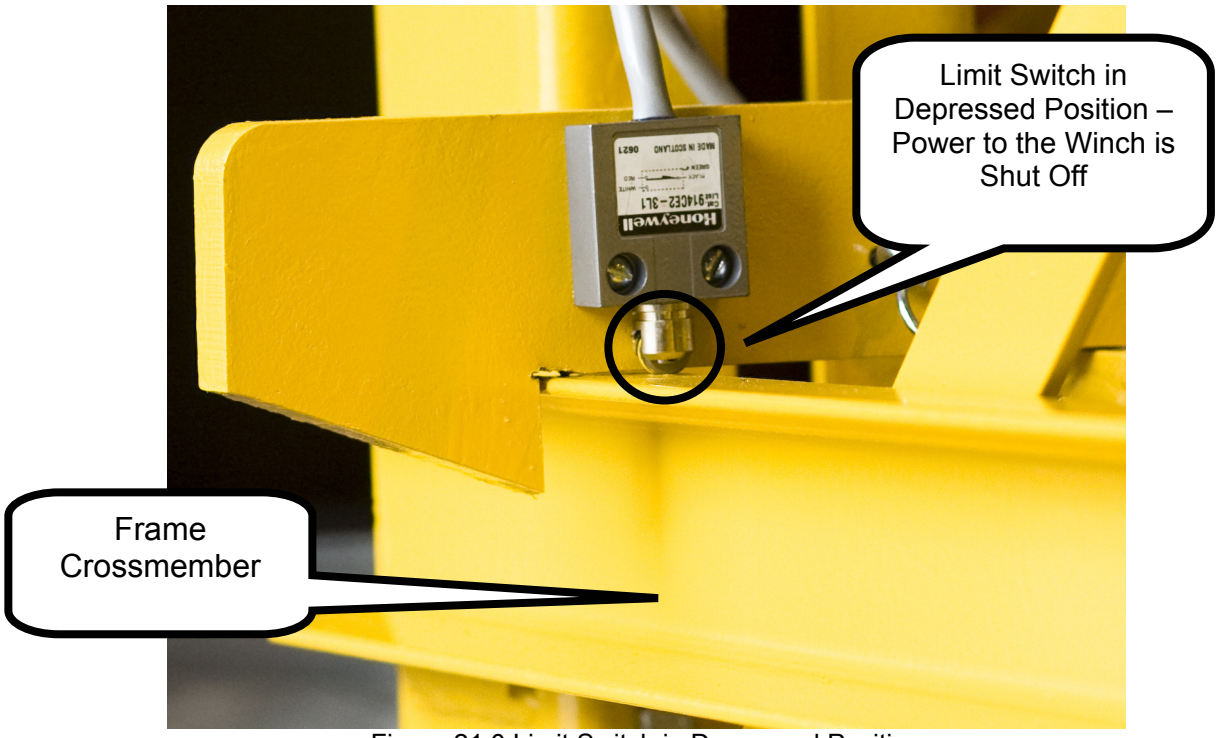


Figure 21.0 Limit Switch in Depressed Position

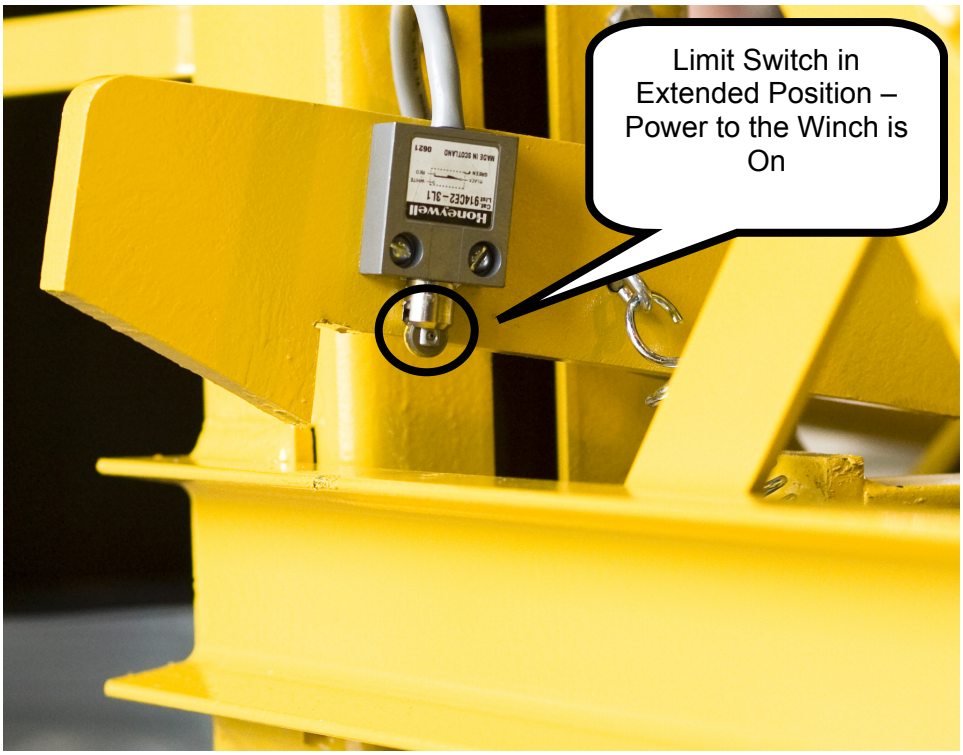


Figure 22.0 Limit Switch in Extended Position

LOWERING THE MPS 350:

To lower the MPS 350 from the Up (Traveling) Position to the horizontal Down (Operating) Position, complete the following steps:

⚠	**DANGER:** Do not operate the MPS 350 near overhead power lines. If the MPS 350 comes into contact or close proximity with a power line or there is arcing, **STAY** in the truck cab. Keep away from any metal parts on the MPS 350. Do no let anyone get close to the truck. Do not attempt to jump from the truck. The Power Company must disconnect the power before you can leave the cab. Know the overhead clearance of overhead obstructions. Never drive the MPS 350 under any overhead obstruction without knowing the clearance height. Failure to follow this warning could cause damage to the MPS 350 and may result in serious personal injury or death.
⚠	**WARNING:** Ensure that no one is near, under or behind the MPS 350 when in operation. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
⚠	**WARNING:** Ensure that the Winch Strap is tight and without any slack before releasing the Latch Bar Assembly. **NEVER** RELEASE THE LATCH BAR ASSEMBLY IF THE WINCH STRAP IS SLACK. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
⚠	**WARNING:** Do not operate the MPS 350 while wearing loose fitting clothing, which may become tangled in the MPS 350 during operation. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

Step	Actions
1	Remove Linchpin and release Chains from Chain Retainer Tabs by unlocking the end of the Clip. Place the Linchpin back in the Chain Retainer Tabs.
2	Manually raise the Latch Bar Assembly by pressing Down on the Latch Bar Handle until the Latch Bar Arms clear the Frame Crossmember completely. Continue pressing Down on the Latch Bar Handle while operating the Control Switch shown in Step 3 Figure 24.0.

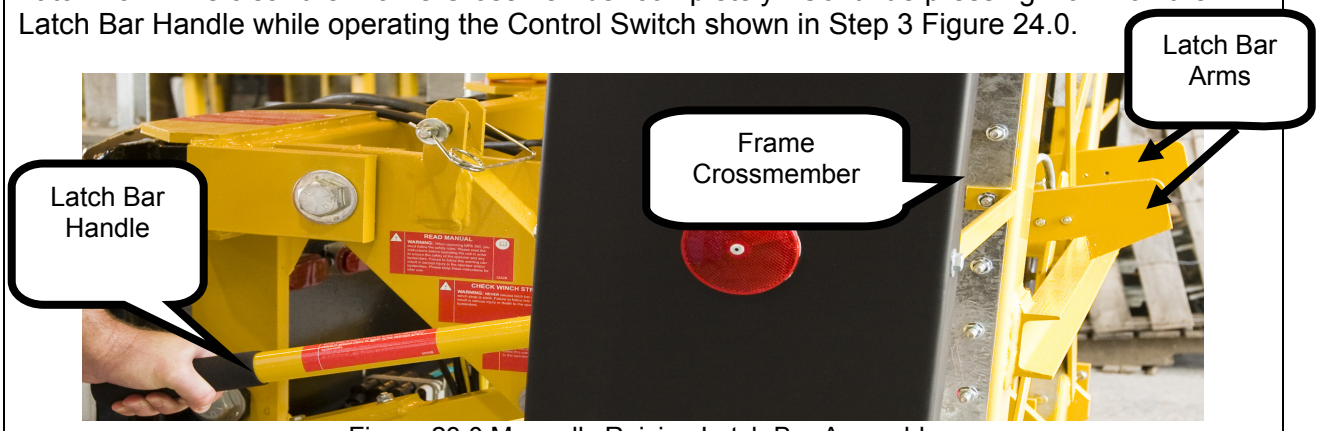


Figure 23.0 Manually Raising Latch Bar Assembly

3	While pressing Down on the Latch Bar Handle, operate the Winch by pressing the Controller Switch's DOWN button. Once the Frame Assembly has started going Down and has cleared the Latch Bar Arms, you can release the Latch Bar Handle. Continue pressing the Controller Switch's DOWN button until the Frame Assembly's weight rest on the Support Chains. Allow the Winch to run to provide slack in the Winch Strap. (See Figure 24.0 Below)

Figure 24.0 MPS 350 Controller Switch

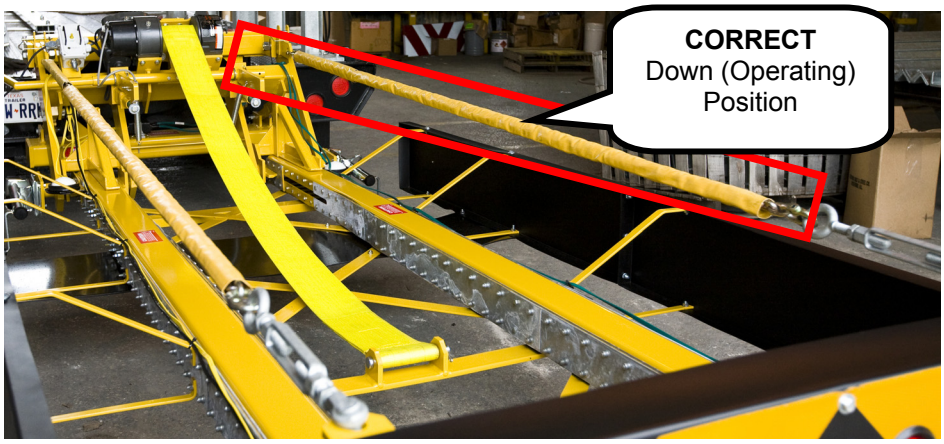


Figure 24.1 MPS 350 in Down (Operating) Position with Weight of Frame Assembly on Chains

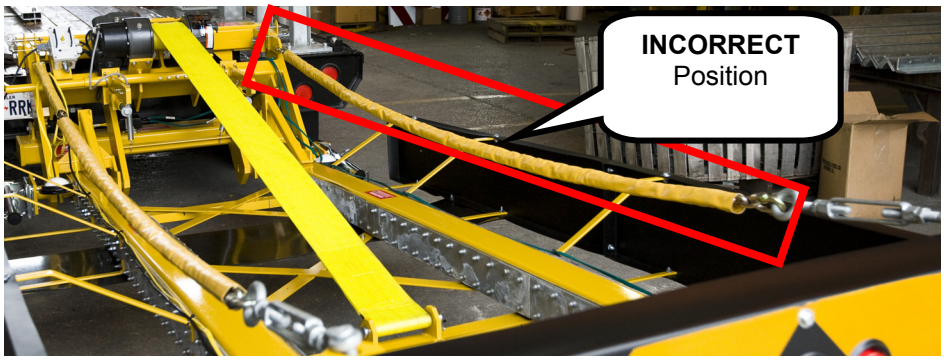


Figure 24.2 MPS 350 in **INCORRECT** Position with Weight of Frame Assembly on Strap

(Step 3 Continued)

⚠	**WARNING:** The MPS 350 must be lowered completely until the Frame Assembly's weight rest on the Support Chains. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
⚠	**CAUTION:** Do not leave the Winch Strap tight in the Down (Operating) Position, while the MPS 350 is being used, the Winch and the attachment point to the Frame Assembly could be damaged.
⚠	**CAUTION:** The Winch Strap on the MPS 350 should **ALWAYS** go over the top of the Winch Drum to ensure proper function of Winch system.

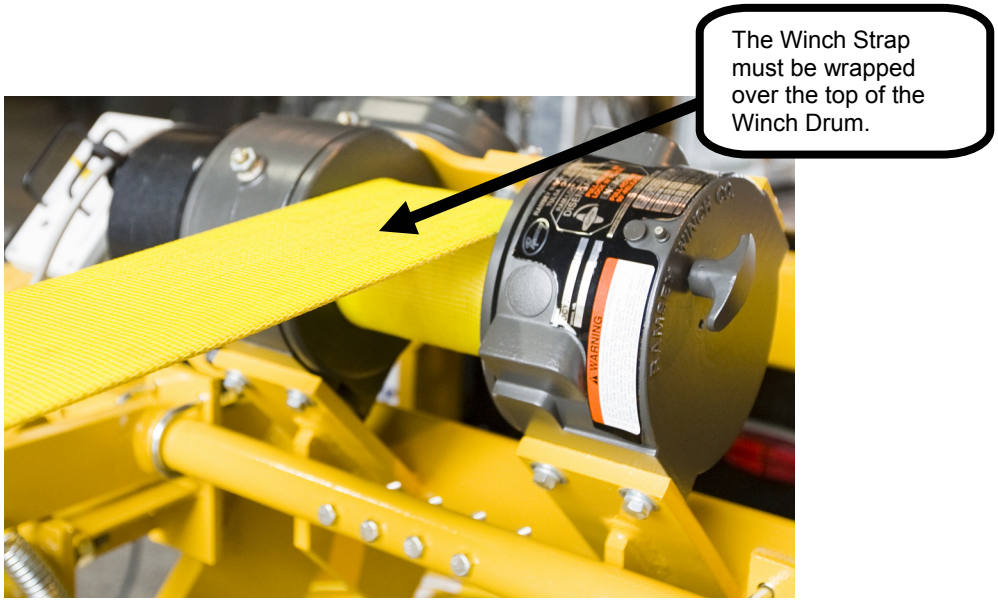


Figure 24.3 Always Locate Strap to Wrap Over Top of Winch Drum

NOTE: A Cab Operated Release System is available for the MPS 350. Contact your Trinity Highway Products representative for more information.

OPERATING HEIGHT: The MPS 350 can be adjusted by raising the MPS 350 with the Winch and then adjusting the Turnbuckle in each Chain Assembly. The MPS 350 should be adjusted for 12" –14" (305 mm - 355 mm) of ground clearance under each rear corner. (See Figure 25.0 Below.)

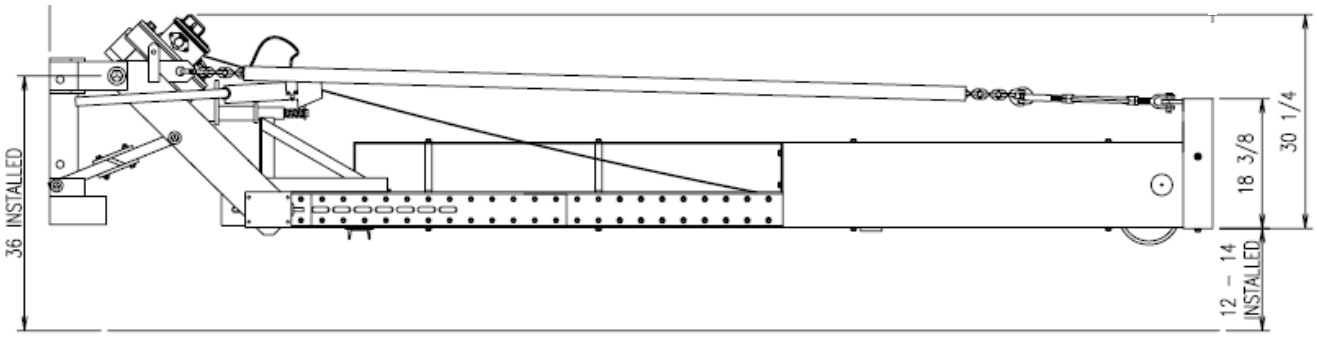


Figure 25.0 MPS 350 Correct Mounting Height (See Appendix Drawing 959/SS-298)

RAISING THE MPS 350:

The MPS 350 must be raised to an Up (Traveling) Position using the Winch.

⚠	**DANGER:** Do not operate the MPS 350 near overhead power lines. If the MPS 350 comes into contact or close proximity with a power line or there is arcing, **STAY** in the truck cab. Keep away from any metal parts on the MPS 350. Do not let anyone get close to the truck. Do not attempt to jump from the truck. The Power Company must disconnect the power before you can leave the cab. Know the overhead clearance of overhead obstructions. Never drive the MPS 350 under any overhead obstruction without knowing the clearance height. Failure to follow this warning could cause damage to the MPS 350 and may result in serious personal injury or death.
⚠	**WARNING:** Ensure that no one is near, under or behind the MPS 350 when in operation. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
⚠	**WARNING:** Failure to ensure proper function of the Limit Switch may result in failure of the Winch.

Step	Actions
1	Push and hold the Controller Switch's UP button until the Latch Bar Arms drop into place. (See Figure 26.0 Below) As the Frame Assembly approaches the Up (Traveling) Position, a pair of Coil Springs located on the Bracket Assembly will contact a Frame Crossmember on the Frame Assembly. The Frame Assembly will compress the Springs until the Latch Bar Arms drop into place. The Limit Switch should stop the upward motion of the Frame Assembly prior to the Frame Assembly bottoming out against the tubes that contain the Springs.

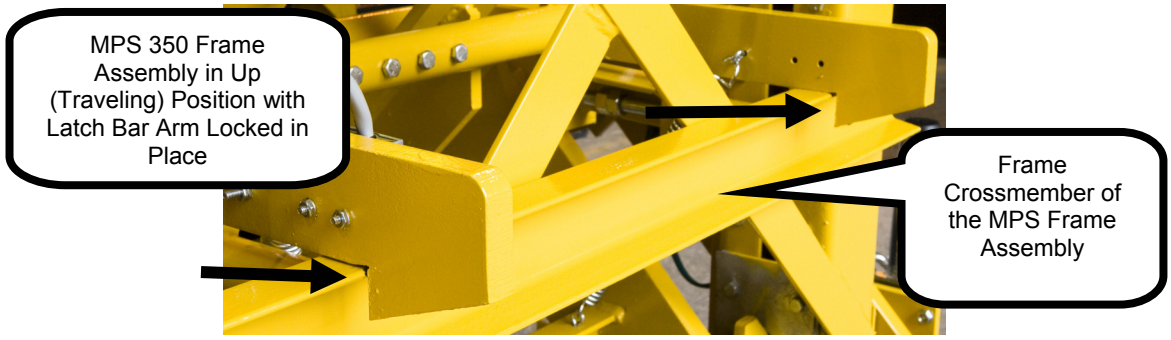

MPS 350 Frame Assembly in Up (Traveling) Position with Latch Bar Arm Locked in Place
Frame Crossmember of the MPS Frame Assembly

Figure 26.0 MPS 350 Latch Bar Arms in Locked Position

Note: If the Limit Switch fails to contact the Frame Crossmember on the frame in a way that activates the switch, it may be necessary to add a piece of thin shim material to the side of the Frame Crossmember to fill the resulting gap.

Figure 26.1 Shim Under Limit Switch to Ensure Proper Contact with Frame Crossmember

CHAIN RETAINER:

The MPS 350 is supplied with a Linchpin and a pair of Chain Retainer Tabs located at the top of the Bracket Assembly. When the MPS 350 is raised to the full Up (Traveling) Position, the operator should lock the Chains between the Chain Retainer Tabs with the Linchpin. This will provide an additional level of safety and will keep the Chains from swinging.

Complete the following steps to lock the Chains with the Linchpin:

Step	Actions
1	With the MPS 350 in an Up (Traveling) Position, open the Clip on the Linchpin and remove the Linchpin from the Chain Retainer Tabs. (See Figure 27.0 Below)
2	Insert the Chain between the Chain Retainer Tabs. Next, insert the Linchpin through the Chain Retainer Tabs and Chain. Lock the Clip on the end to secure in place. (See Figure 27.0 Above)

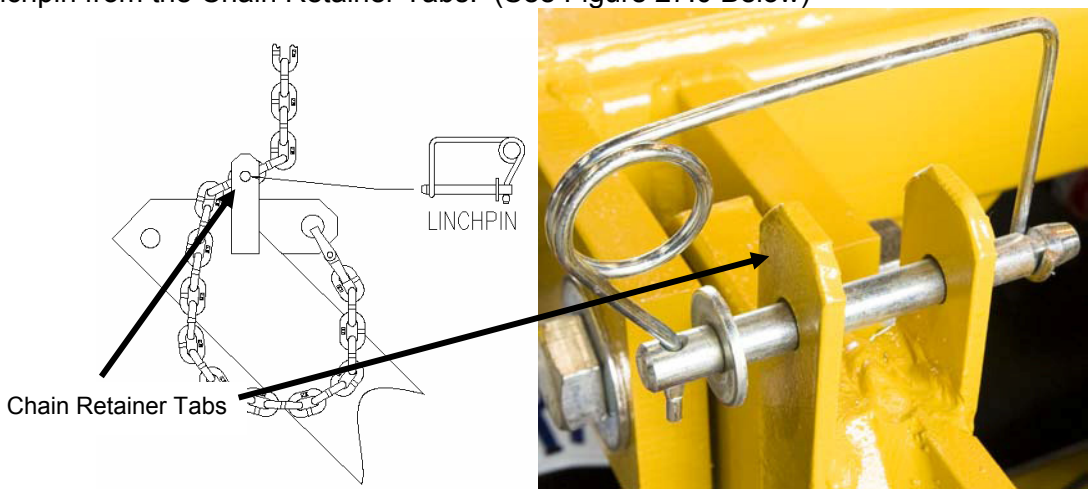
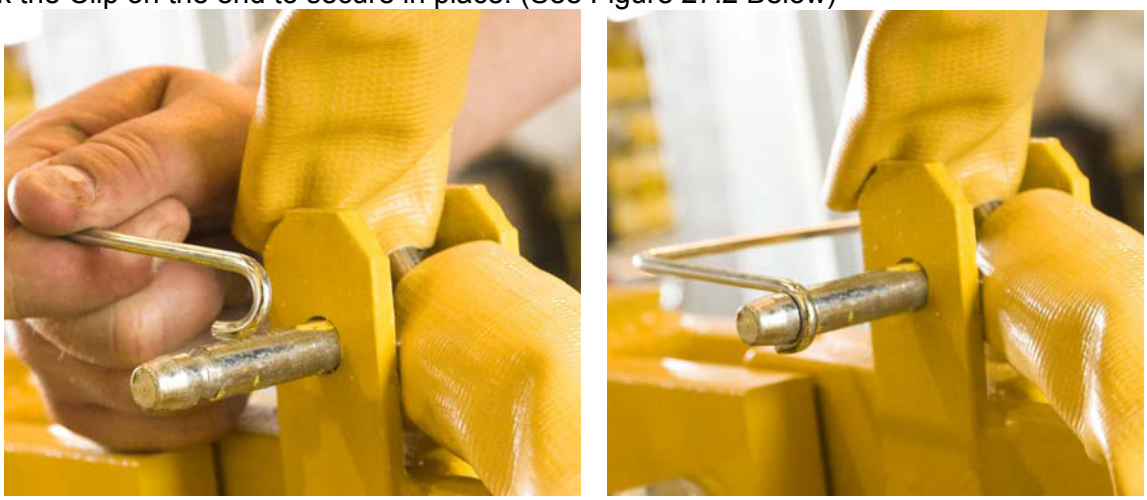


Figure 27.0 MPS 350 Chain Retainer

Figure 27.1 Inserting Chain Between the Chain Retainer Tabs

3	Lock the Clip on the end to secure in place. (See Figure 27.2 Below)  Figure 27.2 MPS 350 Securing Linchpin
4	Repeat the above steps for the second Chain.

NOTE: Later models of the MPS 350 may be equipped with Protective Chain Covers that do not allow the Linchpins to restrain the Chains as shown in the Chain Retainer figure. In this case, the Protective Covers may be cut in two at the appropriate location to allow the insertion of the Linchpin.

USING THE JACKS TO REMOVE THE MPS 350 FROM THE TRUCK:

The MPS 350 is supplied with three screw-type Jacks that can be used to maneuver the unattached MPS 350 away from the truck.

DANGER: Do not operate the MPS 350 near overhead power lines. If the MPS 350 comes into contact or close proximity with a power line or there is arcing, **STAY** in the truck cab. Keep away from any metal parts on the MPS 350. Do not let anyone get close to the truck. Do not attempt to jump from the truck. The Power Company must disconnect the power before you can leave the cab.

Know the overhead clearance of overhead obstructions. **NEVER** drive the MPS 350 under any overhead obstruction without knowing the clearance height. Failure to follow this warning could cause damage to the MPS 350 and may result in serious personal injury or death.

WARNING: Ensure that no one is near, under or behind the MPS 350. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

CAUTION: Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities.

Step	Actions
1	Confirm the truck is on a flat level ground.
2	Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels to ensure that the truck does not move, and do not start the truck. Remove the keys from the ignition of the truck. Place signs on the truck that it is being serviced – DO NOT START ENGINE.
3	Ensure the MPS 350 is in the Down position. There are three critical mounting locations where the Jacks must be attached. (See Figure 28.0 and Figure 28.1 Below) Align each Jack even with the mounting locations.

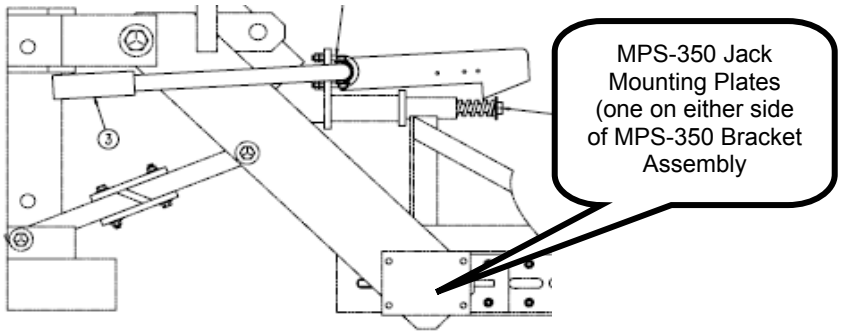


Figure 28.0 Side View - MPS 350 Jack Mounting Plates – Bracket Assembly Location

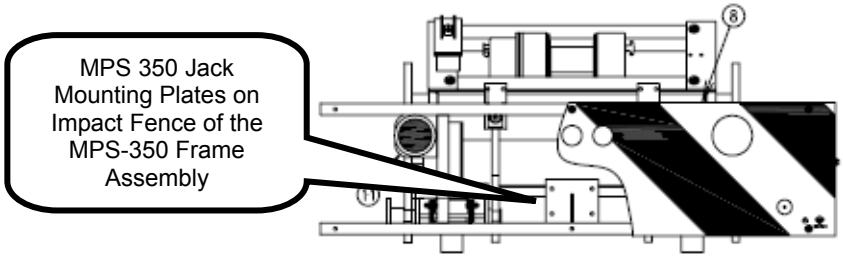


Figure 28.1 Rear View - MPS 350 Jack Mounting Plates – Frame Assembly Location

4	Insert the four (4) Bolts (Part Number 3217G) and secure with four (4) Nuts (Part Number 3257G). Repeat this step until all three (3) Jacks are attached. (See Figure 29.0 Below)
5	Use the hand crank to lower the Jacks until the wheels touch the ground. (See Figure 30.0 Below)

Figure 29.0 Three (3) Jack Attachment Locations - Jacks Attached with Four (4) Bolts/Nuts

Figure 30.0 MPS 350 Jack (See Appendix Drawing 5678)

6	Using the appropriate tools, remove the four (4) Bolts that attach the MPS 350 to the truck. (See Figure 31.0 Below) Figure 31.0 MPS 350 Bumper Assembly Bolts Mounting MPS 350 to Truck Frame
7	It may be necessary to use the Jacks to adjust the height so that the Bolts can be easily removed. (See Figure 32.0 Below) Figure 32.0 Adjusting MPS 350 Height Manually with Jacks
8	Lower the MPS 350 at all three Jack points with the Jacks.
9	Roll the MPS 350 away from the truck.

USING THE JACKS TO ATTACH THE MPS 350 TO THE TRUCK:

The MPS 350 is supplied with three screw-type Jacks that can be used to position the MPS 350 to the truck.

⚠	**DANGER:** Do not operate the MPS 350 near overhead power lines. If the MPS 350 comes into contact or close proximity with a power line or there is arcing, **STAY** in the truck cab. Keep away from any metal parts on the MPS 350. Do not let anyone get close to the truck. Do not attempt to jump from the truck. The Power Company must disconnect the power before you can leave the cab. Know the overhead clearance of overhead obstructions. **NEVER** drive the MPS 350 under any overhead obstruction without knowing the clearance height. Failure to follow this warning could cause damage to the MPS 350 and may result in serious personal injury or death.
⚠	**WARNING:** Ensure that no one is near, under or behind the MPS 350. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.
⚠	**CAUTION:** Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities.

Step	Actions
1	Confirm the truck is on a flat level ground.
2	Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels to ensure that the truck does not move, and do not start the truck. Remove the keys from the ignition of the truck. Place signs on the truck that it is being serviced – DO NOT START ENGINE.
3	Roll the MPS 350 toward the truck. (See Figure 33.0 Below) The Jack wheels allow proper lateral positioning. This step may require more than one person to steer the MPS 350 while it's on the Jacks. Figure 33.0 Positioning the MPS 350

4	Raise the MPS 350 with the Jacks until the Bracket Assembly height is even with the holes on the truck's Bumper. (See Figure 34.0 Below) Figure 34.0 Match MPS 350 Bracket Assembly and Bumper Connection Points
5	Insert the four (4) Bolts that attach the MPS 350 Bracket Assembly to the truck's bumper. (See Figure 35.0 Below) Figure 35.0 MPS 350 Bumper Assembly to Truck Bumper Connection Bolts

6	Use the hand crank to raise the MPS 350 until the wheels do not touch the ground. (See Figure 36.0 Below) Figure 36.0 MPS 350 Jacks in Raised Position
7	Remove the Bolts to un-secure the Jacks. (See Figure 37.0 Below) Figure 37.0 Removal of MPS 350 Jacks

Note: Completely remove the Jacks from the MPS 350 to ensure that the Jacks are not damaged during operations. Reattach the Jacks when it is necessary to remove the MPS 350 from the truck.

WHEN THE MPS 350 IS HIT

!	**CAUTION:** Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.
!	**CAUTION:** Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities.
!	**WARNING:** Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

During a vehicle impact, the MPS 350 will function in a series of events:

1. The 3/8" (10mm) diameter Shear Bolts located in the Shear Bars will shear.
2. The Bracket Assembly will rotate to a vertical orientation until it hits the bottom Lower Bumper Crossmember on the Bumper Assembly.
3. The Frame Assembly will begin to move forward and under the truck as the Galvanized Plates on the sides of the beams are cut by the Cutter.
4. The impacting vehicle and the MPS 350 frame will come to rest together after some distance that depends on the speed and weight of the impacting vehicle.
5. The figure below shows how the MPS 350 drops Down and travels under the truck.

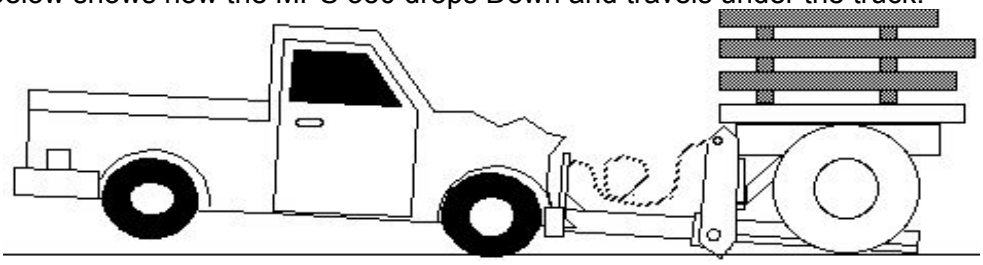


Figure 38.0 Illustrated Vehicle Impact on MPS 350

NUISANCE HIT

A **NUISANCE HIT** will require replacement of the Shear Bolts. (Only Approved Trinity Highway Products replacement parts are allowed. Refer to Drawing 33599/SS621 in the Appendix for Bolt orientation and part numbers.) This may become necessary due to nuisance hits, excessive bouncing, or poor preventative maintenance. The operation can be performed in the field or in the shop quickly, safely, and accurately using the steps shown below:

Step	Actions
1	Remove the Shear Bars from each side of the MPS 350 and replace the 3/8" Shear Bolts with approved Trinity Highway Products replacement parts. Refer to Drawing 33599/SS621 in the Appendix for Bolt orientation and part numbers.
2	Disconnect the Chain Assemblies on the rear of the MPS 350.
3	Run out a small amount of slack in the Winch Strap to allow the Frame Assembly to remain on the ground.

4	Use a separate floor Jack or ground Jack under the Frame Crossmember of the Frame Assembly to slowly raise the MPS 350 back to 12" - 14" position. (See Figure 25.0) (It may be necessary to place blocks under the Bracket Assembly at various points in the raising, in order to reposition the Jack.)
5	Replace the Shear Bars with the Shear Bolts oriented properly. Refer to Drawing 33599/SS621 in the Appendix for the correct installation arrangement.
6	Raise the Frame Assembly with the Winch and/or the rear Jack.
7	Reconnect the Chain Assemblies.
8	Retract and remove the rear Jack if used in Step 6.
9	Continue operations.

LOW-SPEED HIT

⚠	**CAUTION:** Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.
⚠	**CAUTION:** Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities.
⚠	**WARNING:** Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

A **LOW-SPEED HIT** is one that rips less than 45” (1145mm) of the Galvanized Rip Plates. This length includes the precut 6” slot on the front of the Frame Assembly. (See Figure 39.0 Below)

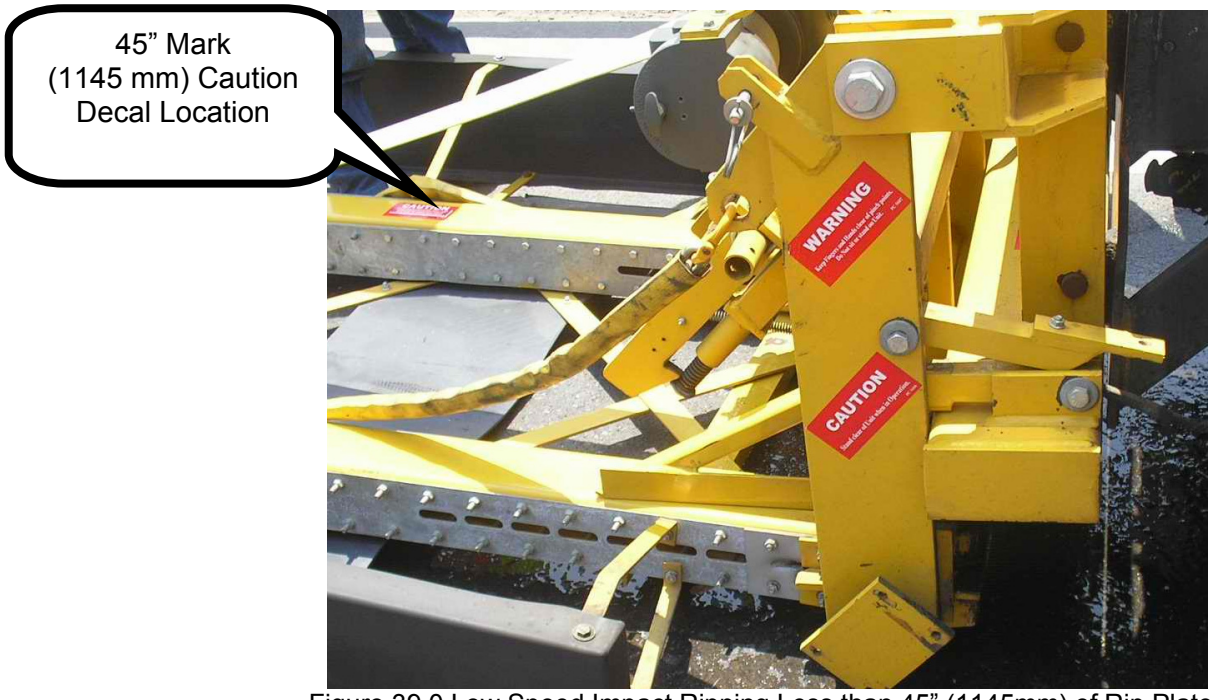
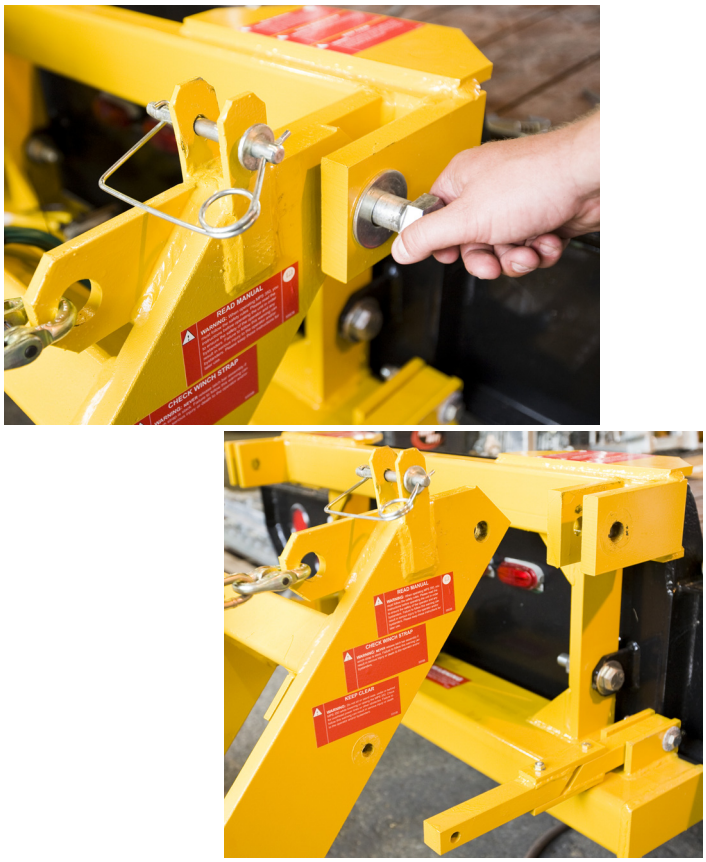


Figure 39.0 Low Speed Impact Ripping Less than 45” (1145mm) of Rip Plates

Should such an impact occur, complete the following steps to release the MPS 350:

Step	Actions
1	Release the Bracket Assembly from the Bumper Assembly by removing the two Hex Bolts. (See Figure 40.0 Below)  Figure 40.0 Releasing MPS 350 Bracket Assembly from Bumper Assembly
2	Transport the Bracket Assembly and Frame Assembly to the repair facility by a wrecker. (See Figure 41.0 Below) Figure 41.0 Transporting MPS 350 Bracket Assembly and Frame Assembly

Note: In some cases, the Winch can be used to lift the Nose of the MPS 350 slightly off the ground and then transported by the truck in a low ground clearance condition. The first 45" (1145mm) of Rip Plate can be replaced and the entire MPS 350 reused.

MEDIUM-SPEED HIT

	CAUTION: Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.
	CAUTION: Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities.
	WARNING: Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

A **MEDIUM-SPEED HIT** is one that rips between 45” (1145mm) and 87” (2210mm). The MPS 350 must be released from the truck and transported by wrecker as described above.

Note: The Frame Assembly must be replaced. If the Bracket Assembly and Bumper Assembly are damaged, they must also be replaced.

HIGH-SPEED HIT

	CAUTION: Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.
	CAUTION: Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities.
	WARNING: Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

A **HIGH-SPEED HIT** is one that rips beyond 87” (2210mm) of Rip Plate. The MPS 350 must be released from the truck and transported by wrecker as described above.

Note: The Frame Assembly and Bracket Assembly must be replaced. The Bumper Assembly must also be replaced if it was damaged.

RAPID FIELD REPLACEMENT OF SHEAR BOLTS

!	**CAUTION:** Inform the truck driver that the MPS 350 is going to be installed, repaired, operated, or adjusted. Block the wheels. Remove the keys from the ignition of the truck and place signs on the truck that it is being serviced – DO NOT START ENGINE.
!	**CAUTION:** Do not use hands or feet to lift or support the MPS 350. Always use Jack supports provided. Always keep feet clear of frame when in operation and during maintenance activities.
!	**WARNING:** Only **APPROVED** Trinity Highway Products replacement parts are allowed. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

Field replacement of the Shear Bolts may become necessary due to nuisance hits, excessive bouncing, or poor preventative maintenance. The operation can be performed quickly, safely, and accurately using the steps shown below:

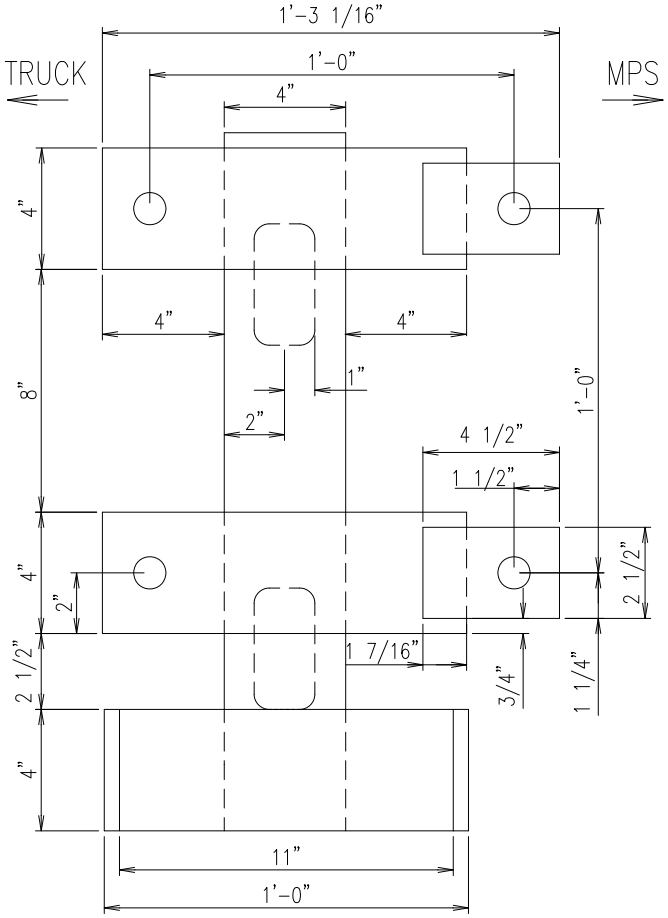
Step	Action
1	Remove the Shear Bars from each side of the MPS 350 and replace the 3/8” (10 mm) Shear Bolts with approved Trinity Highway Products replacement parts. Refer to drawing 33599/SS621 in the Appendix for Bolt orientation and part numbers.
2	Disconnect the Chain Assemblies on the rear of the MPS 350.
3	Run out a small amount of slack in the Winch Strap to allow the MPS 350 frame to remain on the ground.
4	Use a separate floor Jack or ground Jack under the Frame Crossmember of the MPS Frame Assembly to slowly raise the MPS 350 back to 12" - 14" position. (See Figure 25.0) (It may be necessary to place blocks under the Bracket Assembly at various points in the raising, in order to reposition the Jack.)
5	Reconnect the Shear Bars with the Shear Bolts oriented properly. Refer to drawing 33599/SS621 in the Appendix for the correct installation arrangement.
6	Raise the Frame Assembly with the Winch and/or the rear Jack.
7	Reconnect the Chain Assemblies.
8	Retract and remove the rear Jack if used in Step 6.
9	Continue operations.

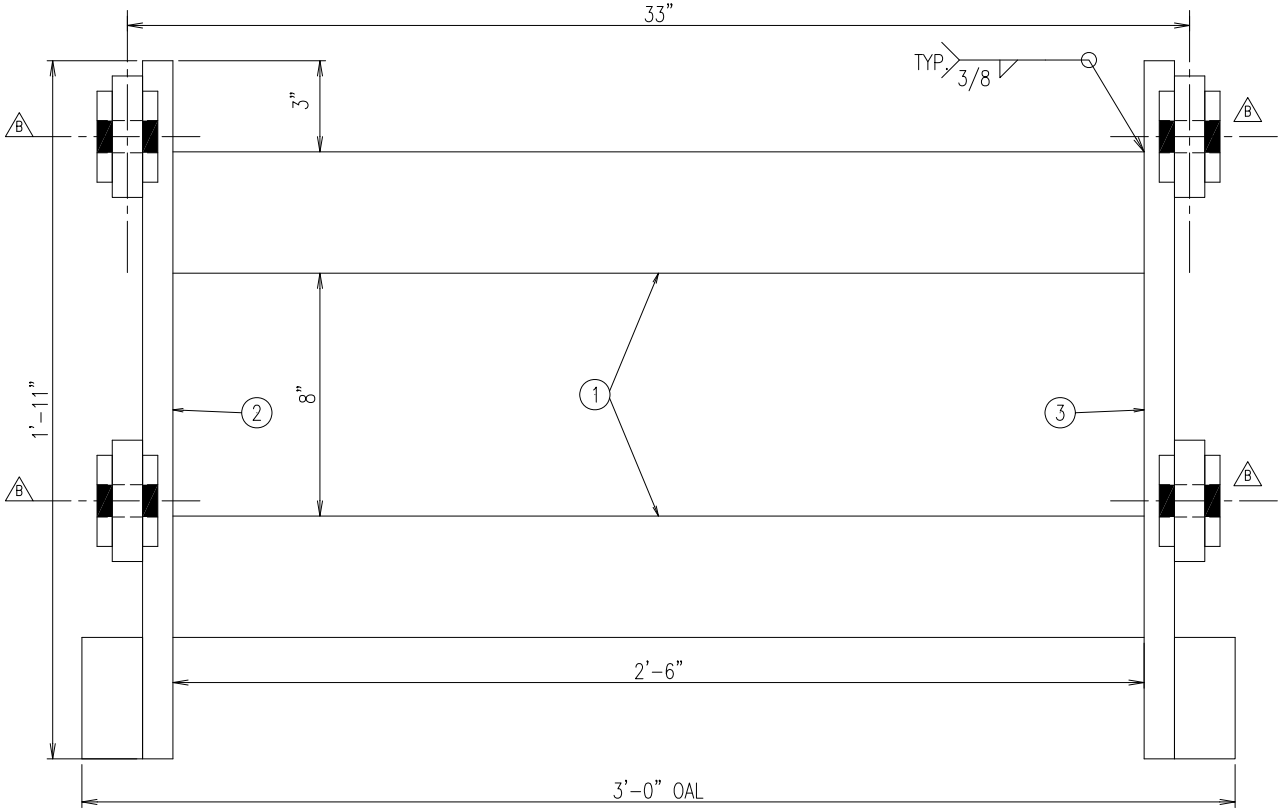
!	**WARNING:** Ensure that all fasteners are secure. Failure to follow this warning could result in serious injury or death to the operator and/or bystanders.

APPENDIX DRAWINGS

12 Inch Extension Weldment MPS 350 898
MPS 350 General Assembly – 2 Sheets.....959/SS-298
Bracket Assembly – 2 Sheets 961
Bumper Assembly.....962
18 Inch Extension Weldment MPS 350 966
Storage Jack Assembly 5678
Stage One Repair Kit 7412
Light System Schematic and Installation – 2 Sheets 7481
Winch and Winch Strap Installation 7484
Limit Switch Assembly 7485
Plastic Kit Installation 7487
Electrical Schematic.....7555
Latch Bar Installation and Assembly.....33598/SS620
Shear Bar Installation…….33599/SS621
Shear Bar Jack Installation and Assembly.....33779/SS299

PARTS LIST			
ITEM	PART NO.	QTY	DESCRIPTION
1	7566B	2	CROSS TUBE
2	7570B	1	LEFTHAND SIDE WELDMENT
3	7569B	1	RIGHTHAND SIDE WELDMENT





NOTE:
1. ALL WELDS CONTINUOUS UNLESS NOTED.

E	LH	4/15/08	REVISED TITLE BLOCK, ADDED DIM'S
D	LH	12/01/05	REVISED MOUNT TAB WIDTH
C	JM	9/16/05	OAL DIM. WAS 3'-2"
B	LH	12/15/03	ADDED HIDDEN HOLES
MK	BY	DATE	REVISION

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CHKD	JRA	10-15-02
APPD	JRA	10-15-02
ITMCLS	MPS	
NLA	TMA	
WEIGHT	185 LBS	

12" EXTENSION
WELDMENT
MPS 350

DRAWING NO: 898

SHEET 1 OF 1 | REV E | SIZE D

BILL OF MATERIAL

ITEM	DESCRIPTION
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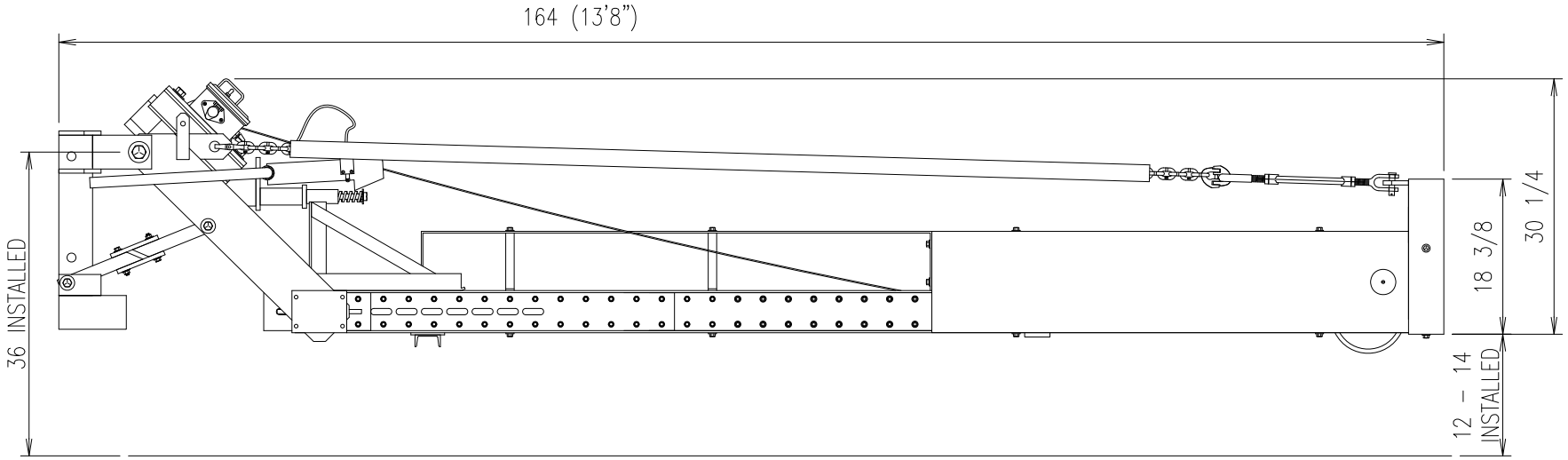

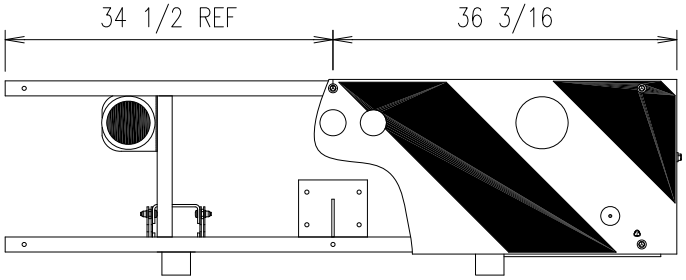

END VIEW SHOWN OUT OF POSITION

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B	REDRAWN ON STANDARD TITLE BLOCK	11/17/03	SAR	
C	REVISED TITLE BLOCK	06/05/07	LH	
D	REMOVED SIDE PANEL STICKERS	07/24/07	LH	

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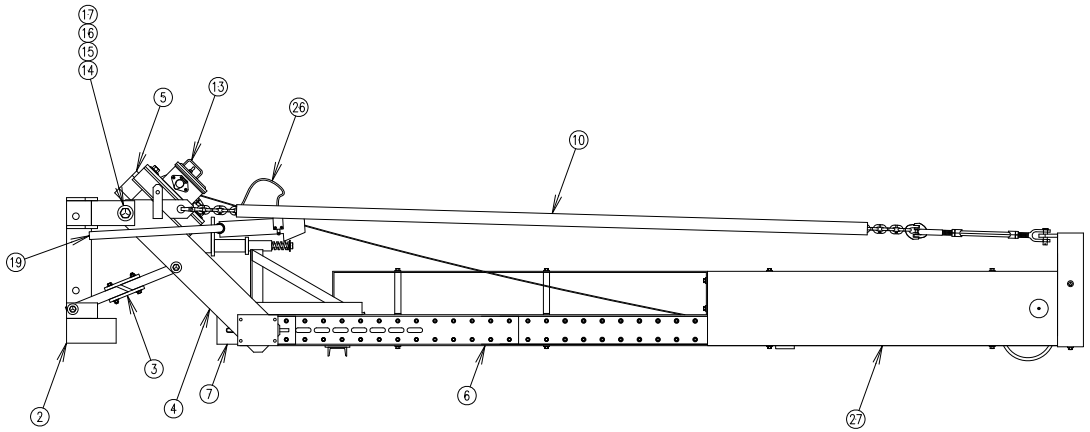
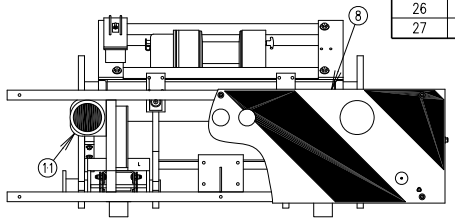
TRUCK MOUNTED ATTENUATOR SIDE AND END VIEWS

DRAWN: BJ	CHKD: JRA	SCALE: N.T.S.	DATE: 8-28-02
DRAWING NO: 959/SS-298 E1 of 2			REV. D





BILL OF MATERIAL

ITEM	PART NO.	QTY	DESCRIPTION
1	7417B	4	MOUNTING CHANNEL
2	962B	1	BUMPER WELDMENT
3	33599B	1	SHEAR BAR INSTALLATION
4	961B	1	BRACKET ASSEMBLY AND WELDMENT
5	7484B	1	WINCH ASSEMBLY
6	960B	1	FRAME ASSEMBLY
7	7409B	2	RETAINER STRAP
8	7487B	1	PLASTIC KIT (#27 NOT INCLUDED)
9	5678B	3	JACK ASSEMBLY
10	7480B	2	CHAIN ASSEMBLY
11	7481B	1	LIGHT KIT
12	7412B	1	RIP PLATE REPAIR KIT
13	7555B	1	ELECTRIC CONTROL BOX ASSEMBLY
14	3120G	2	BOLT, HEXHEAD, 1" x 5" LONG, GRADE 5 PLATED
15	3990G	2	WASHER, FLAT, 1", PLATED
16	3103G	2	WASHER, LOCK, 1", PLATED
17	3992G	2	NUT, HEXHEAD, 1", PLATED
18	3085G	2	LYNCH PIN, 1/2" x 3" LONG
19	33598B	1	LATCH BAR INSTALLATION
20	3257G	12	NUT, WHIZ, 3/8"
21	3217G	12	BOLT, HEXHEAD, 3/8" x 1" LONG, GRADE 5 PLATED
22	7504B	1	DECAL INSTALLATION
23	6517B	1	BOX, SHIP LOOSE PARTS
24	6518B	1	LINER, SHIP LOOSE PARTS BOX
25	6529B	2	PAINT, SAFETY YELLOW
26	7485B	1	LIMIT SWITCH INSTALLATION
27	6190B	4	PLASTIC SIDE BOARD

NOTES:
1. WINCH STRAP IS NOT SHOWN IN END VIEW FOR CLARITY.
2. ITEM 1 IS NOT SHOWN. THIS PART IS IN SHIP LOOSE PACKAGE.
3. ITEM 9 IS NOT SHOWN FOR CLARITY. ITEMS 20 AND 21 MOUNT THE JACK ASSEMBLY.
4. REPAIR RIP PLATES (ITEM 12) ARE IN SHIP LOOSE KIT.
5. MARK SERIAL NUMBER ON TAG ON THE BUMPER PRIOR TO SHIPMENT. RECORD ON ALL PAPERWORK.
6. ITEMS 18, 22, 23, 24, 25, AND 26 ARE NOT SHOWN.

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C	REVISED TITLE BLOCK	06/05/07	LH	
D	REMOVED SIDE PANEL STICKERS	07/24/07	LH	

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ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2"
DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1
ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

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MATERIAL:	FINISH:	

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MPS 350 CRASH ATTENUATOR UNIT GENERAL ASSEMBLY

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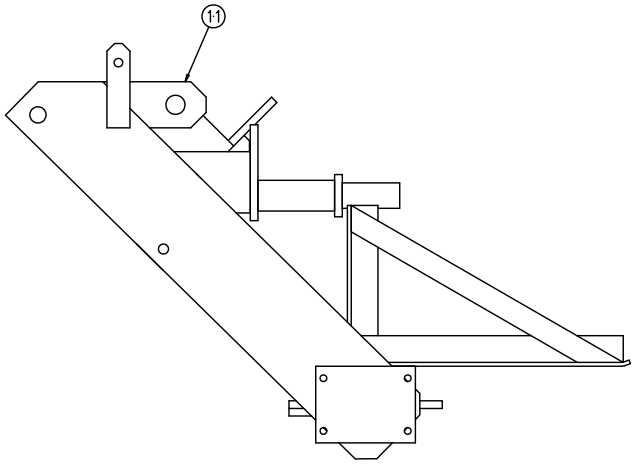
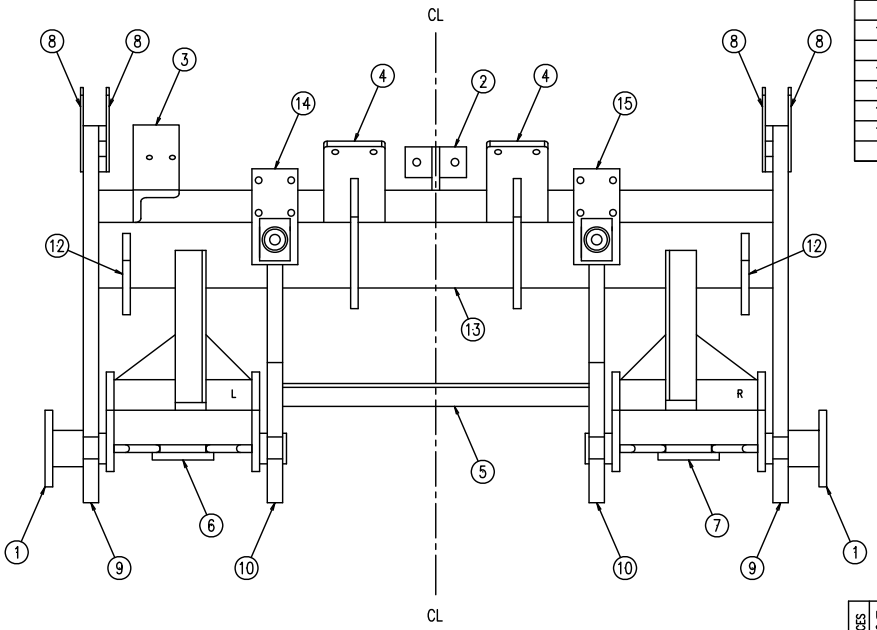
DRAWING NO: 959/SS-298 E2 of 2			REV. D





BILL OF MATERIAL

ITEM	PART NO.	QTY	DESCRIPTION
1	7408B	2	JACK ATTACHMENT PLATE
2	33782B	1	WINCH MOUNT BASE WELDMENT
3	33780B	1	CONTROL BOX MOUNT
4	33781B	2	WINCH MOUNT WELDMENT
5	7444B	1	LATCH BAR SPRING ANGLE
6	–	1	LEFTHAND CUTTER WELDMENT
7	–	1	RIGHTHAND CUTTER WELDMENT
8	7498B	4	CHAIN RESTRAINT TABS
9	7438B	2	OUTTER CUTTER SUPPORT
10	7439B	2	INNER CUTTER SUPPORT
11	7440B	2	CHAIN SUPPORT TAB
12	7441B	2	INNER SHEAR BAR BRACKET
13	7443B	1	WINCH MOUNT TUBE
14	7550B	1	LEFTHAND PUSHDOWN SPRING ASSEMBLY
15	7551B	1	RIGHTHAND PUSHDOWN SPRING ASSEMBLY

NOTES:
1. CENTERLINE SYMMETRY EXCEPT FOR ITEM 3.
2. SEE SHEET TWO FOR DIMENSIONAL INFORMATION AND OTHER DETAILS.

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APPROX. SHPG. WEIGHT: 412.2 LBS

REVISIONS

No.	REMARKS	DATE	BY	CHK.
1	REDRAWN ON STANDARD TITLE BLOCK	11/17/03	SAR	
2	REVISED TITLE BLOCK	6/07/07	LH	

TOLERANCES: UNLESS OTHERWISE SPECIFIED ON THIS DRAWING THE FOLLOWING TOLERANCES SHALL APPLY. SEE TRINITY STANDARDS FOR ADDITIONAL TOLERANCES. FRACTIONS MACHINED ±1/64" (.016") ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2" DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1 ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

NLA: 959B	APPD: JRA	APPD DATE: 4–25–03
MATERIAL:	FINISH:	

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY
DALLAS, TX 75207

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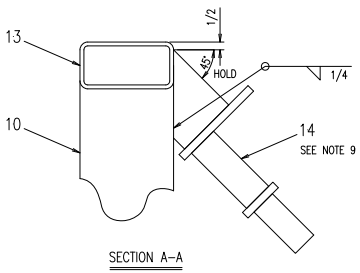
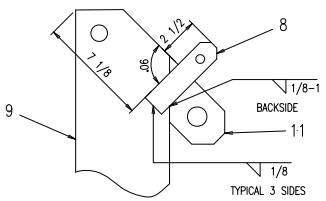
BRACKET ASSEMBLY WELDMENT

DRAWN: BJ	CHKD: BJ	SCALE: N.T.S.	DATE: 10–2–02
DRAWING NO: 961 E1 of 2			REV. 2



SECTION A–A



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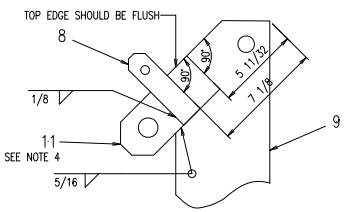
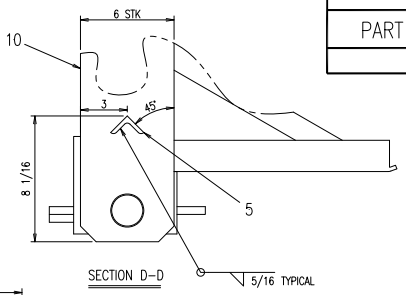
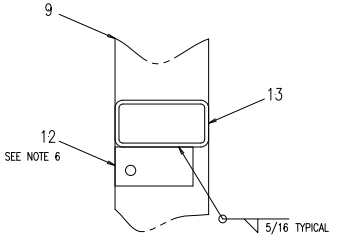


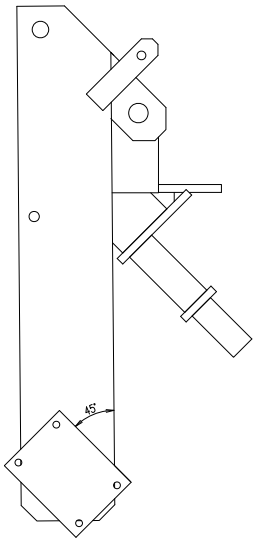
SECTION C–C

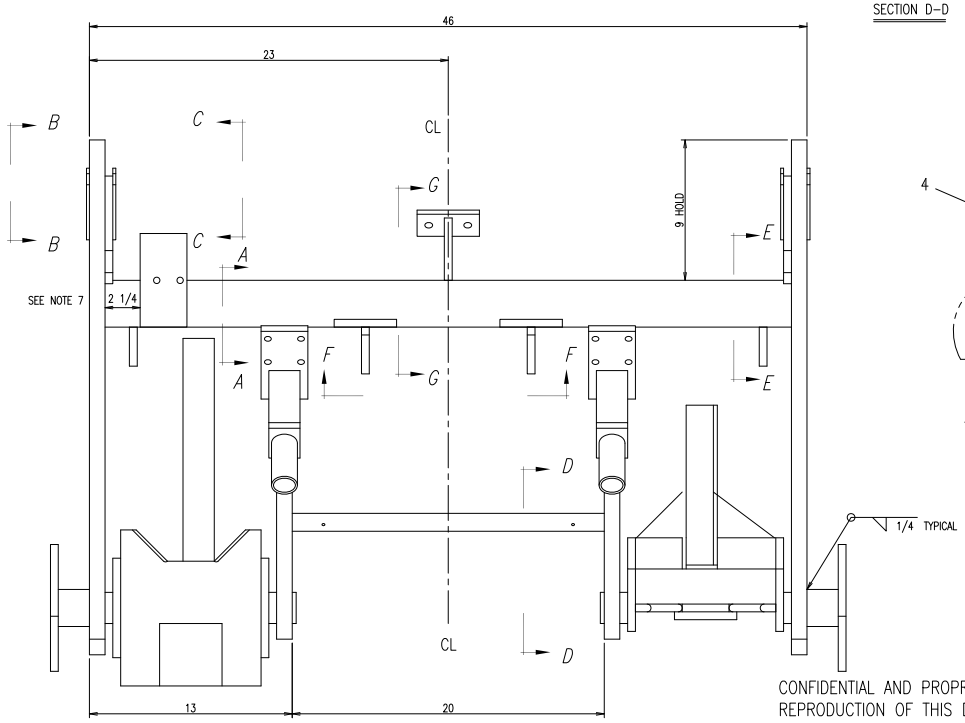


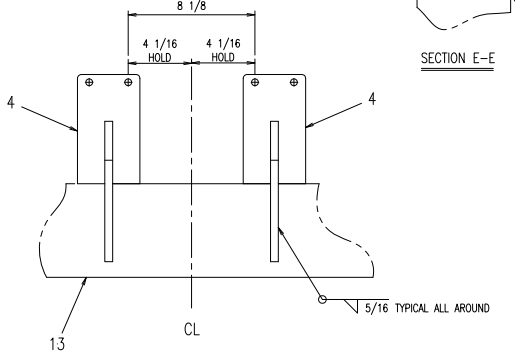
SECTION D–D



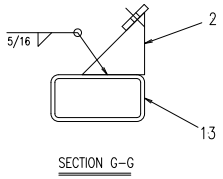
SECTION E–E







SECTION F–F



SECTION G–G

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BILL OF MATERIAL

PART NO.	DESCRIPTION
	SEE SHEET ONE FOR BILL OF MATERIAL

NOTES:
1. CENTERLINE SYMMETRY.
2. UNIT IS ROTATED TO HAVE SUPPORT LEGS (ITEMS 9 AND 10) VERTICAL.
3. RIGHT SIDE IS A MIRROR IMAGE OF LEFT SIDE SECTION B–B.
4. SECTION C–C, FLUSH THE TOP EDGE OF ITEMS 10 AND 11.
5. CUTTER SHOULD ROTATE FREELY AFTER ASSEMBLY. 6. IN SECTION E–E ALIGN HOLES IN ITEMS 9 AND 12 BEFORE WELDING.
7. FLUSH THE BOTTOM OF ITEM 3 WITH ITEM 13.
8. ITEMS 9 AND 10 MUST BE PARALLEL TO EACH OTHER.
9. ITEM 14 IS CENTERED ON ITEM 10. 10. CUTTER NOT SHOWN IN SIDE VIEW.
10. CUTTER NOT SHOWN IN SIDE VIEW.

APPROX. SHPG. WEIGHT: 412.2 LBS

REVISIONS

No.	REMARKS	DATE	BY	CHK.
1	REDRAWN ON STANDARD TITLE BLOCK	11/17/03	SAR	
2	REVISED TITLE BLOCK	6/07/07	LH	

TOLERANCES: UNLESS OTHERWISE SPECIFIED ON THIS DRAWING THE FOLLOWING TOLERANCES SHALL APPLY. SEE TRINITY STANDARDS FOR ADDITIONAL TOLERANCES. FRACTIONS MACHINED ±1/64" (.016") ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2" DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1 ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

NLA: 959B	APPD: JRA	APPD DATE: 4–25–03
MATERIAL:	FINISH:	

TRINITY HIGHWAY PRODUCTS, LLC.
2525STEMMONS FREEWAY
DALLAS, TX 75207

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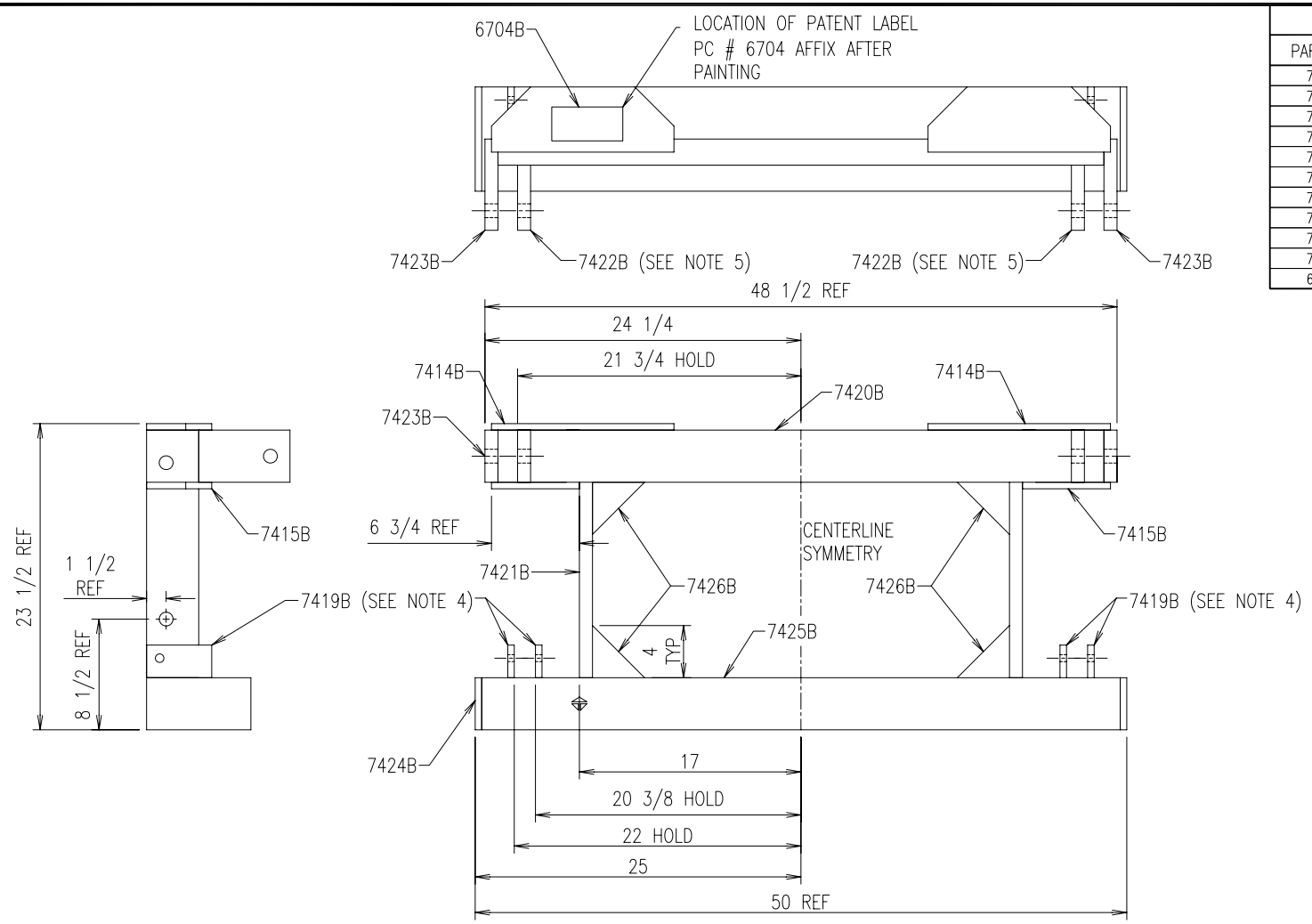
BRACKET ASSEMBLY WELDMENT

DRAWN: BJ	CHKD: BJ	SCALE: N.T.S.	DATE: 10–2–02
DRAWING NO: 961 E2 of 2			REV. 2



BILL OF MATERIAL

PART NO.	QTY	DESCRIPTION
7419B	4	SHEAR BOLT MOUNT PLATE
7420B	1	UPPER TUBE
7421B	2	SIDE MOUNTING PLATE
7422B	2	MOUNT PLATE, INNER
7423B	2	MOUNT PLATE, OUTER
7424B	2	END CAP PLATE
7425B	1	LOWER TUBE
7426B	4	SIDE GUSSETS
7414B	2	MAIN UPPER GUSSET
7415B	2	MAIN LOWER GUSSET
6704B	1	PATENT LABEL

NOTES:
1. ALL FILLET WELDS TO BE 5/16" AND WELD ALL AROUND.
2. MARK ITEM WITH PART NUMBER AND REVISION.
3. REMOVE ALL SHARP EDGES AND BURRS.
4. PART No. 7419B TO BE PARALLEL TO ONE ANOTHER.
5. PART No.'s 7422B & 7423B TO BE PARALLEL TO ONE ANOTHER AND PART No. 7419B.
6. ASSEMBLY HAS SYMMETRY ABOUT THE CENTERLINE.
7. PART No. 7415B SHOULD BE INSTALLED w/6-3/4" LENGTH ACROSS PART.

APPROX. SHPG. WEIGHT: 267 LBS

REVISIONS

No.	REMARKS	DATE	BY	CHK.
B	REVISED PART SUFFIX & TITLE BLOCK SIZE	12/9/03	SAR	
C	REVISED TITLE BLOCK	6/07/07	LH	

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ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2"
DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1
ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

NLA: 959B	APPD: JRA	APPD DATE: 4-25-03
MATERIAL: SEE DETAILS	FINISH: BLACK	

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2525 STEMMONS FREEWAY
DALLAS, TX 75207

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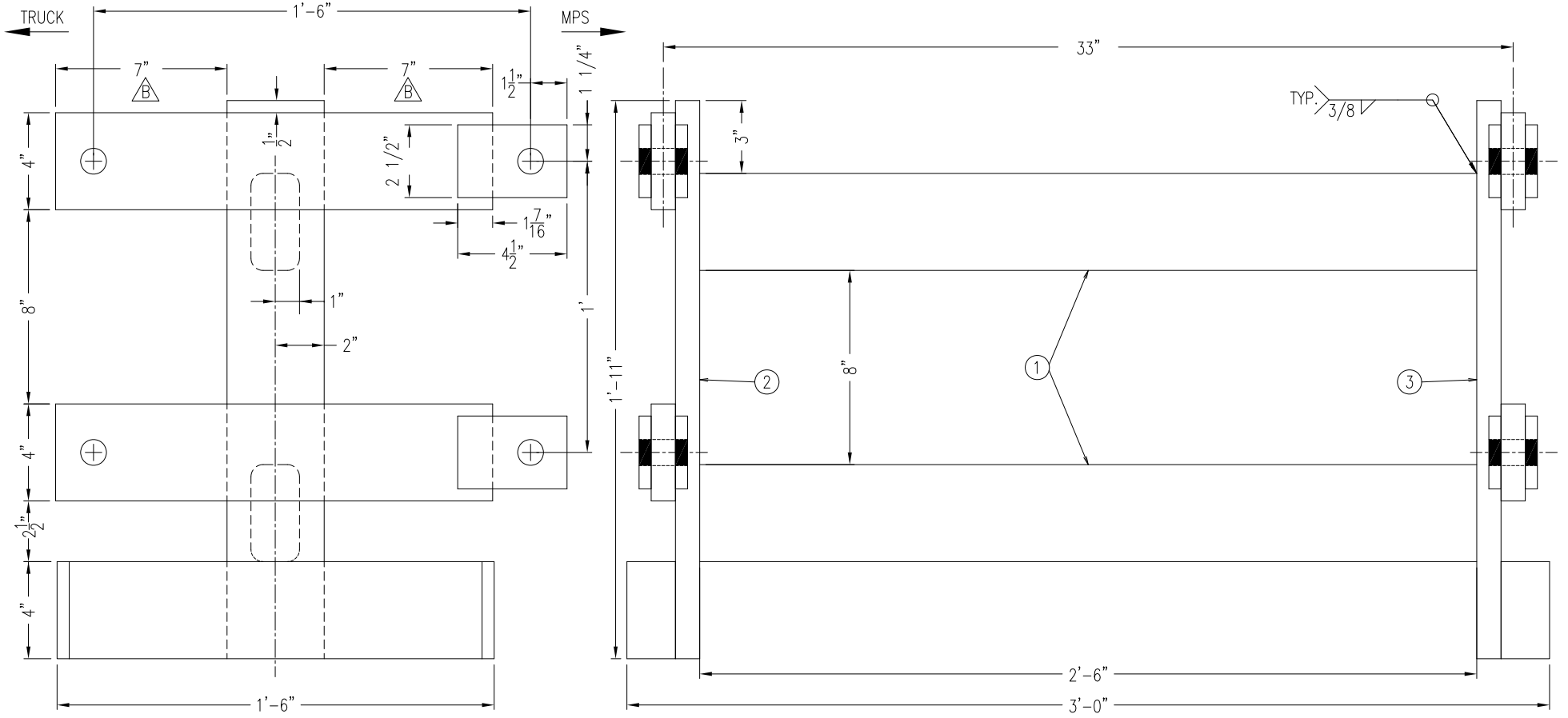
BUMPER WELDMENT ASSEMBLY

DRAWN: BJ	CHKD: BJ	SCALE: N.T.S.	DATE: 11-16-01
DRAWING NO: 962			REV. C

PARTS LIST			
ITEM	PART NO.	QTY	DESCRIPTION
1	7566B	2	CROSS TUBE
2	7571B	1	LEFTHAND SIDE WELDMENT
3	7572B	1	RIGHTHAND SIDE WELDMENT



NOTES:
1. ALL WELDS CONTINUOUS UNLESS NOTED.

REV.	CHK'D	BY	DATE	REMARKS
D	BT	LH	4/15/08	REVISED TITLE BLOCK; ADDED DIM'S
C	JM	BT	9/16/05	DIM WAS 3'-2" & 2'-8"
B	BT	LH	12/11/03	REVISED LOCATING DIMENSIONS

TOLERANCES: UNLESS OTHERWISE SPECIFIED ON THIS DRAWING THE FOLLOWING TOLERANCES SHALL APPLY. SEE TRINITY STANDARDS FOR ADDITIONAL TOLERANCES. FRACTIONS MACHINED ±1/64" (.016") ALL OTHERS: (1" to 2")±1/16", (2" to 10")±1/8", (10" to 20")±1/4", (OVER 20")±1/2" DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1 ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY, DALLAS, TEXAS

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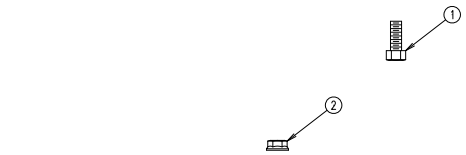
DRAWN	BJ	10-29-02
CHKD	JRA	10-29-02
APPD	JRA	10-29-02
ITMCLS	MPS	
NLA	TMA	
WEIGHT	222.4 LBS	

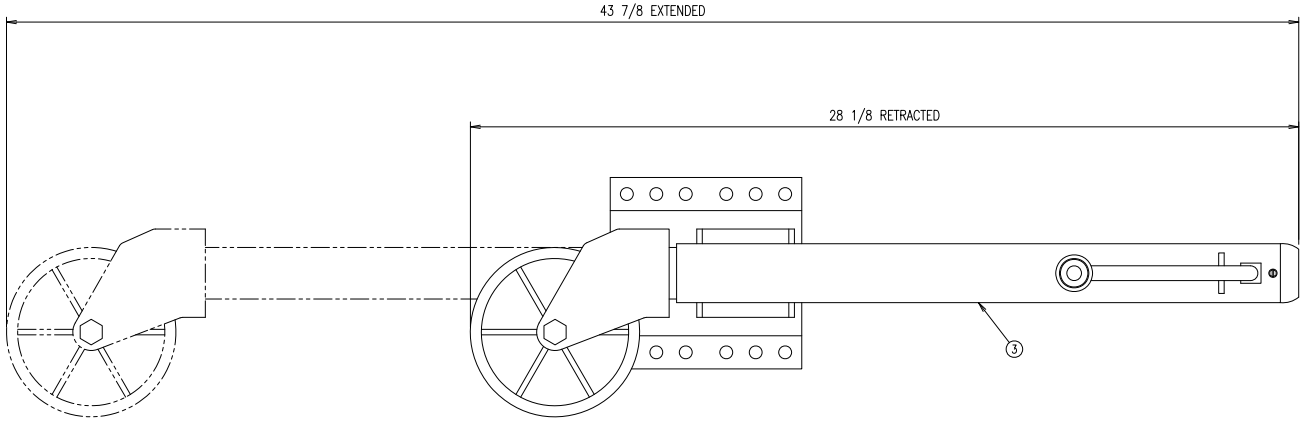
18" EXTENSION
WELDMENT
MPS 350

DRAWING NO: 966

SHEET 1 OF 1 | REV D | SIZE D

PARTS LIST			
ITEM	PART NO.	QTY	DESCRIPTION
1	3217BA	(REF)4	BOLT, HEXHEAD, 3/8-16x1"LG, GR5, PLATED
2	3257BA	(REF)4	NUT, WHIZ, 3/8-16, GR5, PLATED
3	5678A	1	JACK ASSEMBLY





NOTES:
1. JACK SHOWN OUT OF POSITION.
2. ITEMS ARE SHIPPED LOOSE. INSTALL AT FINAL ASSEMBLY IF DESIRED.
3. MOUNTING HARDWARE SHOWN FOR REFERENCE ONLY.

UPFACTOR= 2.667

REVISIONS			
NO.	BY	DATE	REMARKS
1	LH	6/07/07	REVISED TITLE BLOCK

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TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY, DALLAS, TEXAS

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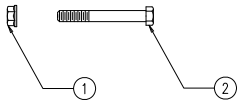
DRAWN	BJ	10-24-02
CHKD	BJ	1-10-03
APPD	JRA	4-08-03
ITMCLS	MPS	
NLA	959B	
WEIGHT	12 LBS	

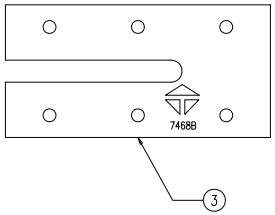
STORAGE JACK ASSEMBLY

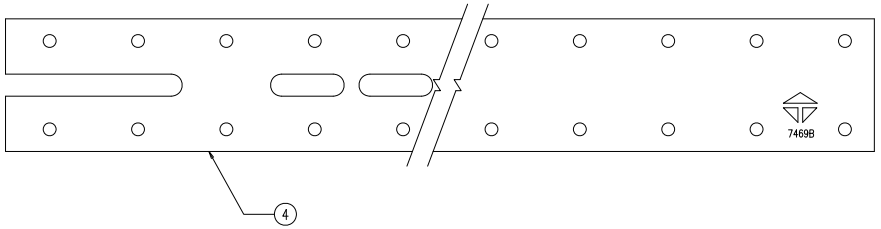
DRAWING NO: 5678

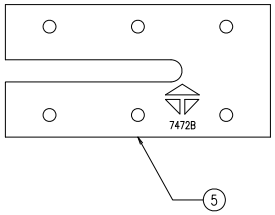
SHEET	REV	SIZE
1 OF 1	1	C

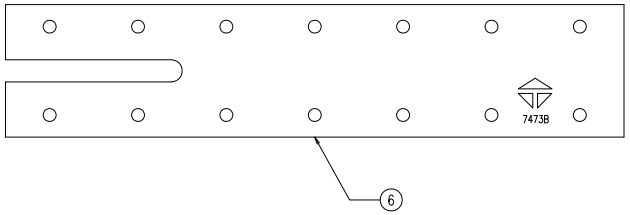
PARTS LIST			
ITEM	PART NO.	QTY	DESCRIPTION
1	3257A	4	NUT, 3/8", WHIZ
2	6830A	4	BOLT, HEXHEAD,3/8-16 x 3" LONG, GRADE 5, PLATED
3	7468A	4	RIP PLATE, 3/16 x 9" LONG
4	7469A	2	RIP PLATE, 16 GAUGE x 45" LONG
5	7472A	2	RIP PLATE, 16 GAUGE x 9" LONG
6	7473A	2	RIP PLATE, 16 GAUGE x 21" LONG











NOTES:
1. THESE ARE SHIP LOOSE PARTS ONLY.
2. CUSTOMER TO INSTALL AT TIME OF IMPACT REPAIR.

UPFACTOR= 2.667

REVISIONS			
NO.	BY	DATE	REMARKS
1	LH	6/07/07	REVISED TITLE BLOCK

TOLERANCES

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ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2"
DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1
ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY, DALLAS, TEXAS

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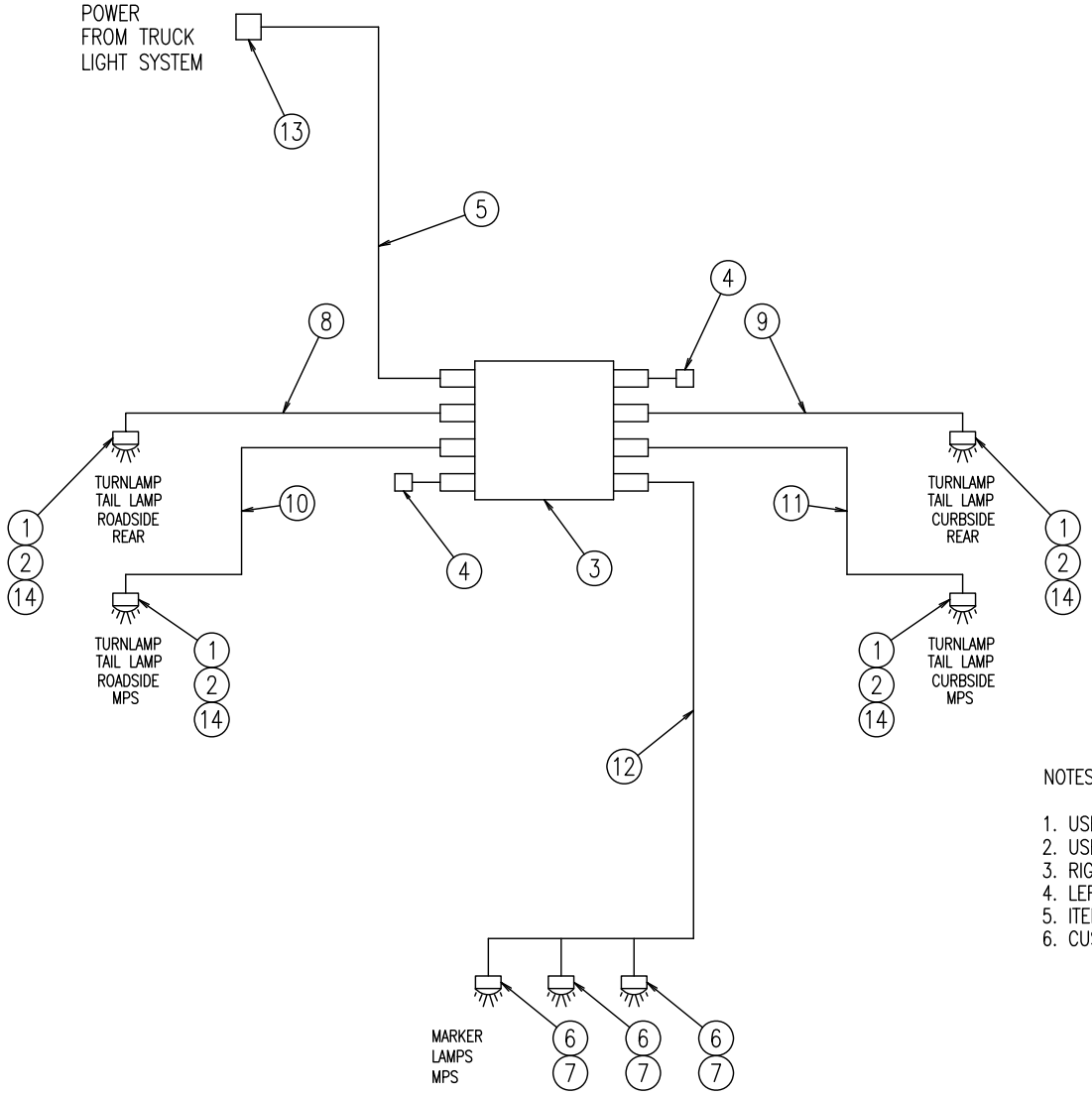
DRAWN	BJ	10-16-02
CHKD	BJ	4-08-03
APPD	JRA	4-08-03
ITMCLS	MPS	
NLA	959B	
WEIGHT	15.5 LBS	

STAGE ONE
REPAIR KIT,
SHIP LOOSE

DRAWING NO: 7412

SHEET	REV	SIZE
1 OF 1	1	C



PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	6083B	4	TAILLIGHT, 4", RED, STT,SEALED
2	6084B	4	GROMMET, 4"
3	6040B	1	JUNCTION BOX
4	6041B	2	KIT, BOOT FILLER
5	6034B	1	HARNESS, MAIN POWER
6	6086B	3	LIGHT, MARKER, RED, 2-1/2"
7	6087B	3	GROMMET, 2-1/2" MARKER LAMP
8	6035B	1	HARNESS, STOP, TURN, TAIL, UNIT, ROADSIDE
9	6036B	1	HARNESS, STOP, TURN, TAIL, UNIT, CURBSIDE
10	6037B	1	HARNESS, STOP, TURN, TAIL, MPS, ROADSIDE
11	6038B	1	HARNESS, STOP, TURN, TAIL, MPS, CURBSIDE
12	6039B	1	HARNESS, 3 LIGHT ICC
13	6082B	1	PLUG, POWER, MAIN HARNESS
14	6085B	1	BRACKET, LAMP, STOP/TAIL/TURN
15	6088B	1	GREASE, DIELECTRIC ASSEMBLY
16	3217B	8	BOLT, HEXHEAD, 3/8 x 1" LONG
17	3257B	12	NUT, WHIZ, 3/8"
18	33759B	2	LIGHT MOUNT EXTENSION
19	6321B	4	BOLT, HEXHEAD, 3/8 x 2" LONG

NOTES:

1. USE 5677B TO PURCHASE TRUCKLITE KIT.
2. USE GREASE (ITEM 15) TO COAT CONNECTORS AT BOTH ENDS OF THE HARNESS.
3. RIGHTHAND SIDE (GREEN) HARNESS MOUNTS ON THE CURB SIDE OF THE UNIT.
4. LEFTHAND SIDE(YELLOW) HARNESS MOUNTS ON THE DRIVER SIDE OF THE UNIT.
5. ITEM 15 NOT SHOWN.
6. CUSTOMER WILL INSTALL LIGHTS WHEN MPS UNIT IS INSTALLED ON TRUCK.

UPFACTOR= 1.333

REVISIONS

NO.	BY	DATE	REMARKS
1	LH	6/07/07	REVISED TITLE BLOCK

TOLERANCES: UNLESS OTHERWISE SPECIFIED ON THIS DRAWING THE FOLLOWING TOLERANCES SHALL APPLY. SEE TRINITY STANDARDS FOR ADDITIONAL TOLERANCES. FRACTIONS MACHINED ±1/64" (.016") ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2" DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1 ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY, DALLAS, TEXAS

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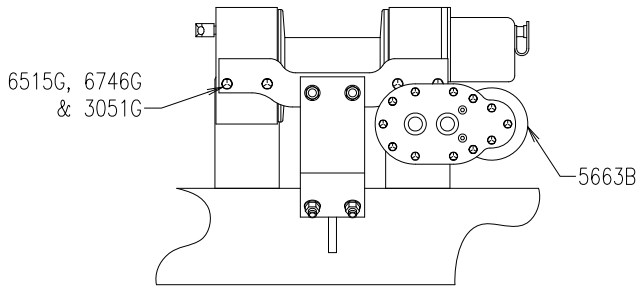
DRAWN	BJ	3-11-02
CHKD	BJ	2-11-03
APPD	JRA	4-08-03
ITMCLS	MPS	
NLA	959B	
WEIGHT	18 LBS	

LIGHT SYSTEM SCHEMATIC AND INSTALLATION

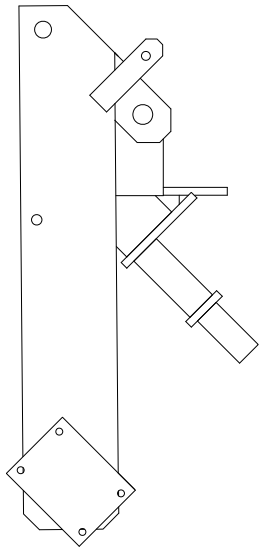
DRAWING NO: 7481

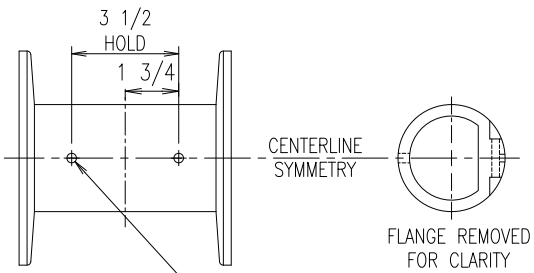
SHEET 1 OF 2 | REV 1 | SIZE C



VIEW B–B

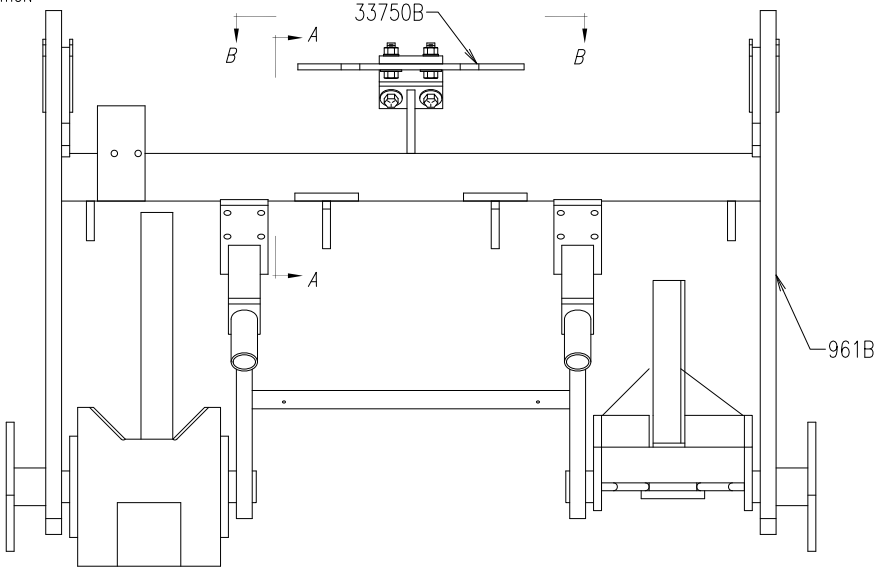
VIEW SHOWN 180° OUT OF POSITION

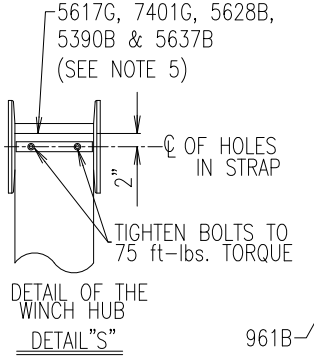




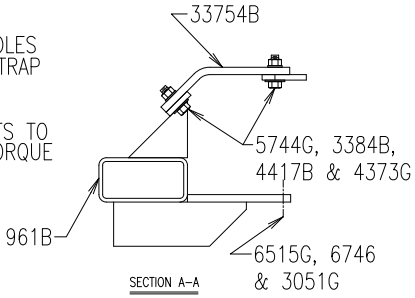
NOTE: HOLES TO BE DRILLED OPPOSITE THE CABLE LAND ANCHOR HOLE.

DETAIL "H" ⚠





DETAIL OF THE WINCH HUB
DETAIL"S"



SECTION A–A

BILL OF MATERIAL

	PART NO.	QTY	DESCRIPTION
	961B	REF	BRACKET ASSEMBLY
C	5663B	1	WINCH ASSEMBLY, RAMSEY
C	5744G	4	1/2" x 2" HEXHEAD BOLT, GRADE 5 PLATED
	3384B	4	WASHER, LOCK, 1/2"
	4417B	4	NUT, HEXHEAD, 1/2"
D E	5617G	2	1/2 x 1" HEX SOCKET BUTTON HD CAP SCREW (ASTM F835, PLATED)
G	7401G	1	STRAP, RETAINER
	5628B	1	PIN, WINCH STRAP, 1" x 8" LONG
	5390B	1	PIN, COTTER, 3/16"
	5637B	1	STRAP ASSEMBLY, 6" x 120" LONG
B	4373G	4	WASHER, FLAT, 1/2"
B	33750B	1	WISHBONE, WINCH MOUNT
B	33754B	1	ANGLE PLATE
C	6515G	8	3/8"–16 x 1–1/2" HEXHEAD BOLT, GRADE 5 PLATED
C	6746G	8	TMA 3/8" LOCKWASHER PLATED
C	3051G	8	TMA–3/8" FLAT WASHER

NOTES:
1. PART No. 5663B IS NOT SHOWN ELEVATION VIEW FOR CLARITY.
2. REFER TO 5663B FOR WINCH DETAILS.
3. BOLTS THAT INSTALL WISHBONE (PART No. 33750B) TO WINCH MUST BE INSTALLED IN THE CORRECT PLACE. FAILURE TO PUT BOLTS IN CORRECT POSITION COULD CAUSE GEARBOX DAMAGE.
4. ⚠ WHEN INSTALLING STRAP; EXTEND STRAP 2" PAST THE CENTERLINE OF THE RETAINER BAR; (SEE DETAIL "S")
5. ⚠ ⚠ SEE DETAIL "H" TO DRILL AND TAP 1/2–13 HOLES IN DRUM, ADD THESE HOLES ONLY IF NOT PRESENT IN EXISTING WINCH HUB.
6. USE PART No. 7401G AS PATTERN TO MAKE HOLES IN STRAP AFTER LOCATING IN NOTE 4.
7. PART No's. 5628B & 5390B ARE NOT SHOWN FOR CLARITY.
8. CUTTER ASSEMBLIES ARE NOT SHOWN IN THE SIDE VIEW.
9. DISCARD SHIPPING BRACKETS AND HARDWARE.

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REPRODUCTION OF THIS DRAWINGS
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APPROX. SHPG. WEIGHT: NA

REVISIONS

No.	REMARKS	DATE	BY	CHK.
B	ADDED PARTS AND CHANGED VIEW	07/02/03	BJ	
C	CHANGED WINCH, 1/2" HDWE, ADDED 3/8" HDWE	08/19/03	LH	
D	ADDED DETAIL "H", CHG'D B.O.M. & NOTES	11/13/03	SAR	
E	REMOVED ITEM No's. & ADDED PART No's.	12/10/03	SAR	
F	UPDATED STRAP MOUNTING HARDWARE	06/13/07	LH	BT
G	UPDATED BILL OF MATERIAL	07/25/07	LH	BT

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SEE TRINITY STANDARDS FOR ADDITIONAL TOLERANCES. FRACTIONS MACHINED ±1/64" (.016")
ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2"
DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1
ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

NLA: 959B	APPD: JRA	APPD DATE: 04–25–03
MATERIAL: AS NOTED	FINISH: NA	

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY
DALLAS, TX 75207

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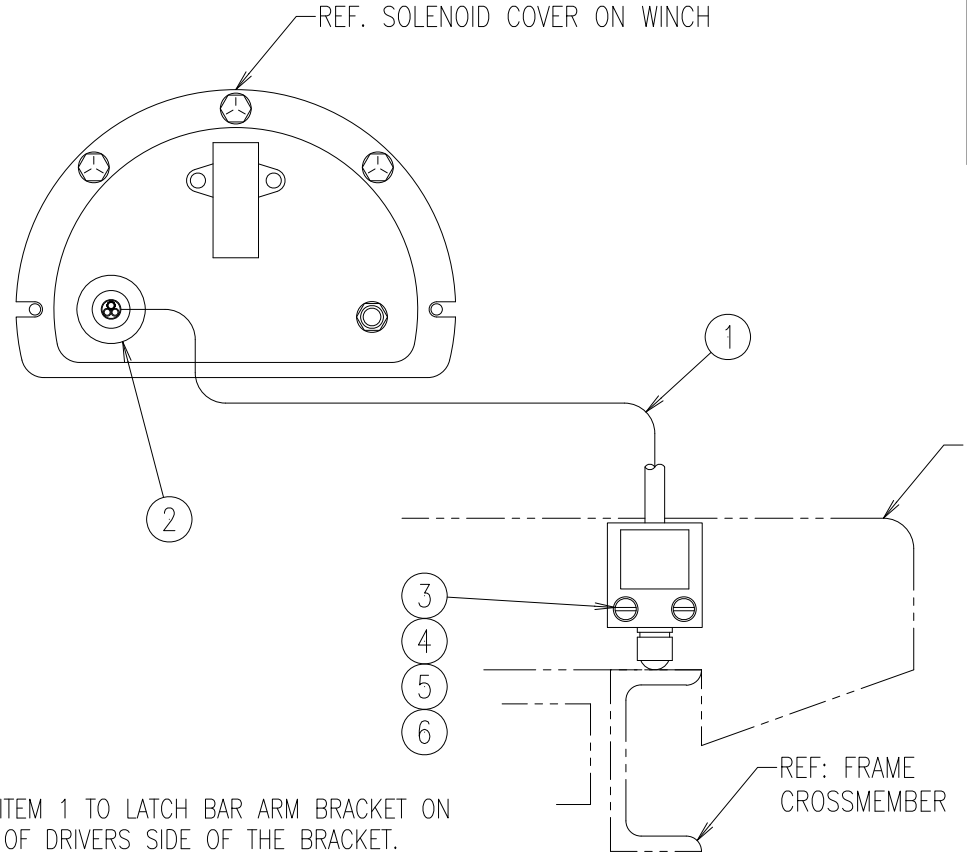
WINCH AND STRAP INSTALLATION

DRAWN: BJ	CHKD: BJ	SCALE: N.T.S.	DATE: 10–02–02
DRAWING NO: 7484			REV. G



NOTES:

1. ATTACH ITEM 1 TO LATCH BAR ARM BRACKET ON OUTSIDE OF DRIVERS SIDE OF THE BRACKET.
2. LIMIT SWITCH WILL DISRUPT POWER INTO WINCH ELECTRONICS. OBJECTIVE IS TO SHUTDOWN THE WINCH AFTER LATCHING THE FRAME IN THE UPRIGHT POSITION.
3. DRILL HOLE IN COVER AS SHOWN TO MOUNT ITEM 2.
4. REFER TO 7555B FOR WIRING DIAGRAM
4. ITEMS 1 & 2 ARE CALLED OUT ON 7555B

PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	6623B	1	LIMIT SWITCH, MS 914CE2-3
2	5627B	1	CORD GRIP, 16/3 SO
3	4748G	2	BOLT, ROUND HEAD SLOTTED, #10 PLATED x 2-1/2" LONG
4	3765G	2	WASHER, FLAT,#10 PLATED
5	5401G	2	WASHER, LOCK, #10 PLATED
6	5864G	2	NUT, HEX HEAD, #10 PLATED

REVISIONS

NO.	BY	DATE	REMARKS
1	LH	6/07/07	REVISED TITLE BLOCK

TOLERANCES

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DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1
ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY, DALLAS,TEXAS

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DRAWN	BJ	12-19-02
CHKD	BJ	12-19-02
APPD	JRA	4-08-03
ITMCLS	MPS	
NLA	959	
WEIGHT	2.0 LBS	

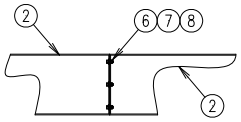
LIMIT SWITCH ASSEMBLY

DRAWING NO: 7485

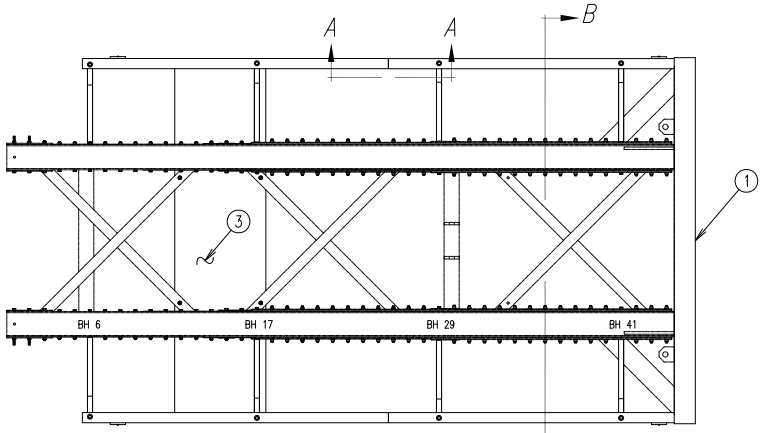
SHEET 1 OF 1 | REV 1 | SIZE B

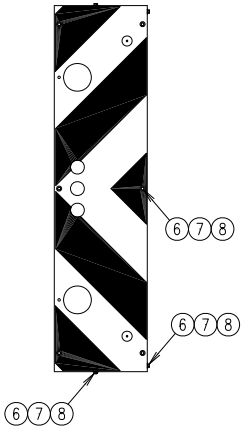
PARTS LIST

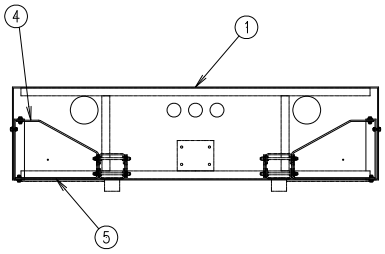
ITEM	PART NO.	QTY	DESCRIPTION
1	6081B	1	NOSE ASSEMBLY, BLACK, w/ YELLOW REFLECTIVE
2	6190B	4	SIDEBOARD ASSEMBLY
3	6080B	1	BOTTOM SHEET ASSEMBLY w/ YELLOW REFLECTIVE
4	7410B	8	UPPER SIDEBOARD MOUNT STRAPS
5	7411B	8	LOWER SIDEBOARD MOUNT STRAPS
6	3217B	42	BOLT, HEXHEAD,3/8"x1" LONG, GRADE 5 PLATED
7	3051B	42	WASHER, FLAT, 3/8", PLATED
8	3257B	42	NUT, WHIZ, 3/8"



SECTION "A-A"







SECTION "B-B"

NOTES:
1. SIDEBOARD IS FORMED BY BOLTING TWO OF THE ITEM 2's TOGETHER.
2. THE SIDEBOARDS MOUNT USING ITEMS 4 AND 5. THE BRACKETS, ITEMS 4 AND 5 MOUNT ON EXISTING BOLTS IN THE BEAMS. USE THE BOLTS IN LOCATIONS 6, 17, 29, AND 41 TO MOUNT THE BRACKETS.
3. SIDEPIECES TUCK UNDER THE NOSEPIECE. THE SIDEPIECE BOLTS TO THE NOSE ON THE BOTTOM AND A MATCH DRILLED HOLE ON THE SIDE OF THE NOSEPIECE AS SHOWN AT TIME OF ASSEMBLY.
4. SUGGEST ORDER OF INSTALLATION IS THE NOSEPIECE, SIDEBOARDS, AND THEN THE BOTTOMSHEET.
5. THE BOTTOM SHEET (ITEM 4) TUCKS UNDER THE SIDE PIECES. THE OUTBOARD HOLES ON THE BOTTOM SHEET ARE MATCH DRILLED.
6. ITEM #2 IS NOT INCLUDED IN KIT.

REVISIONS

NO.	BY	DATE	REMARKS
1	LH	6/07/07	REVISED TITLE BLOCK
2	LH	07/24/07	REMOVED SIDEPANEL STICKERS

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TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY, DALLAS, TEXAS

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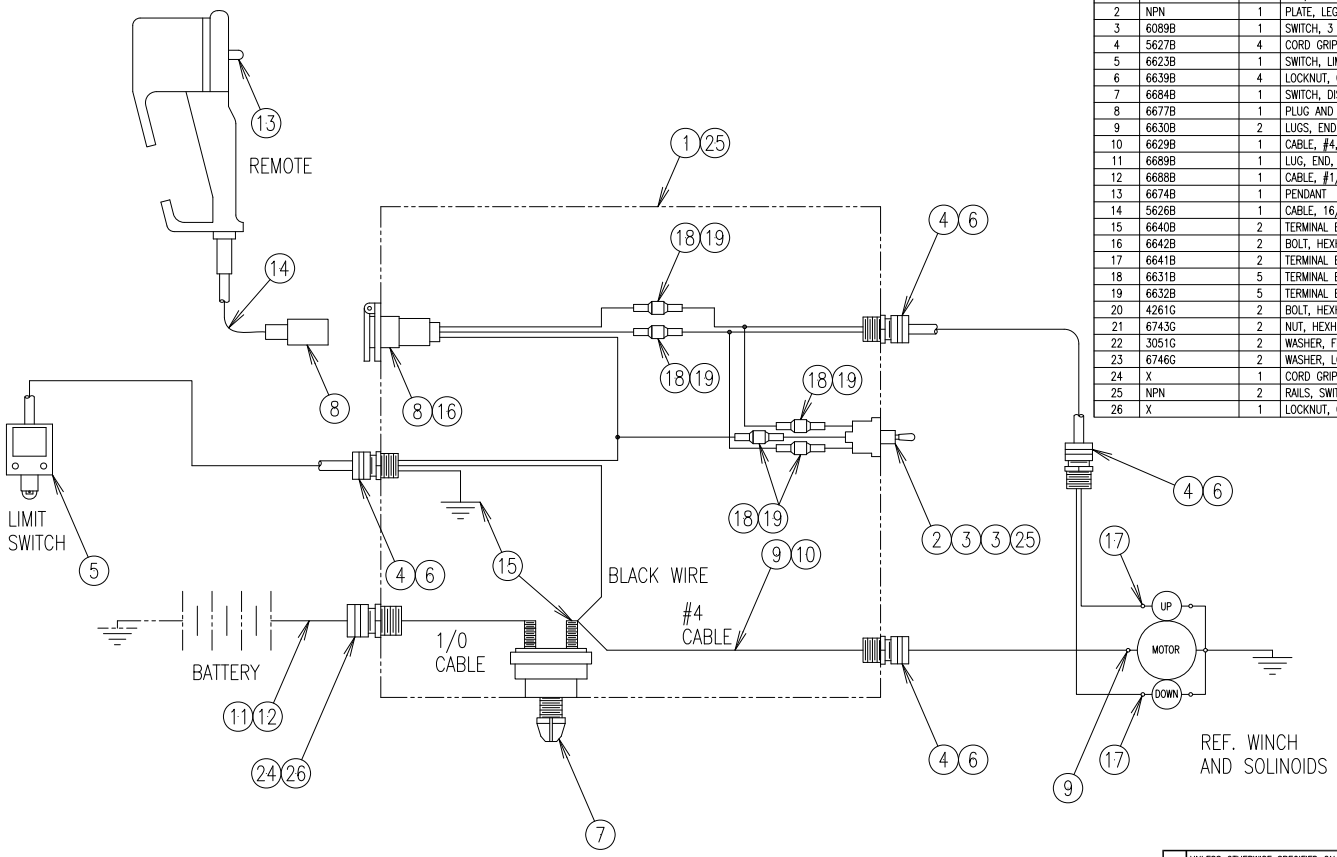
DRAWN	BJ	2-12-03
CHKD	BJ	5-17-03
APPD	JRA	4-08-03
ITMCLS	MPS	
NLA	959B	
WEIGHT	55 LBS	

PLASTIC KIT INSTALLATION, BLACK COMPONENTS

DRAWING NO: 7487 | SHEET 1 OF 1 | REV 2 | SIZE D



PARTS LIST			
ITEM	PART NO.	QTY	DESCRIPTION
1	6621B	1	BOX, CONTROL, FIBERGLASS
2	NPN	1	PLATE, LEGEND
3	6089B	1	SWITCH, 3 POSITION, MOMENTARY
4	5627B	4	CORD GRIP
5	6623B	1	SWITCH, LIMIT
6	6639B	4	LOCKNUT, CONDUIT, 1/2"
7	6684B	1	SWITCH, DISCONNECT
8	6677B	1	PLUG AND SOCKET ASSEMBLY, 4 POLE
9	6630B	2	LUGS, END #4
10	6629B	1	CABLE, #4, 16" LONG
11	6689B	1	LUG, END, #1/0
12	6688B	1	CABLE, #1/0, 28" LONG
13	6674B	1	PENDANT
14	5626B	1	CABLE, 16/3 SO CORD x 72" LONG
15	6640B	2	TERMINAL END, 3/8" RING, RED
16	6642B	2	BOLT, HEXHEAD, 1/4" x 1/2" LONG, GRADE 5 PLATED
17	6641B	2	TERMINAL END, 1/4" FEMALE, INSULATED, RED
18	6631B	5	TERMINAL END, 1/4" FEMALE, INSULATED, BLUE
19	6632B	5	TERMINAL END, 1/4" MALE, INSULATED, BLUE
20	4261G	2	BOLT, HEXHEAD, 3/8" x 1-1/2" LONG, GRADE 5 PLATED
21	6743G	2	NUT, HEXHEAD, 3/8", GRADE 5 PLATED
22	3051G	2	WASHER, FLAT, 3/8"
23	6746G	2	WASHER, LOCK, 3/8"
24	X	1	CORD GRIP
25	NPN	2	RAILS, SWITCH GUARD
26	X	1	LOCKNUT, CONDUIT

NOTES:
1. ITEMS 1 AND 2 NOT SHOWN FOR CLARITY.
2. ITEMS 20, 21, 22, AND 23 MOUNT BOX(ITEM 1), ARE NOT SHOWN FOR CLARITY.
3. INSTALL ITEM 15 ON LIMIT SWITCH GROUND WIRE HEAD OF BOLT (ITEM 20) AT INSTALLTION OF BOX ON UNIT.

REVISIONS			
NO.	BY	DATE	REMARKS
1	LH	6/07/07	REVISED TITLE BLOCK

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2525 STEMMONS FREEWAY, DALLAS, TEXAS

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DRAWN	BJ	11-08-02
CHKD	BJ	11-08-02
APPD	JRA	4-08-03
ITMCLS	MPS	
NLA	959B	
WEIGHT	22 LBS	

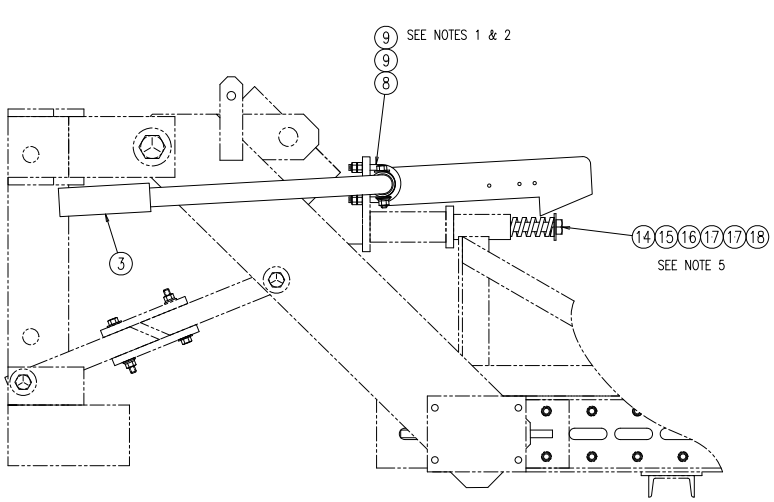
ELECTRICAL SCHEMATIC NEW BOX

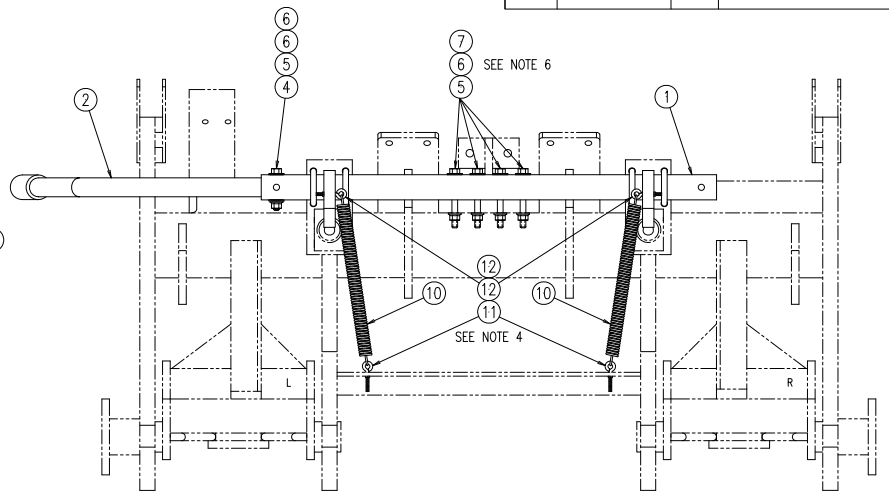
DRAWING NO: 7555

SHEET	REV	SIZE
1 OF 1	1	C

PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	7544B	1	LATCH BAR WELDMENT
2	7554B	1	LATCH BAR HANDLE WELDMENT
3	6635B	1	HANDLE GRIP
4	6718G	1	BOLT, HH, 3/8" x 2-1/4" LONG, GR5
5	3257G	5	FLANGE NUT, 3/8"
6	3051G	6	WASHER, FLAT, 3/8"
7	6078G	4	BOLT, HH, 3/8" x 3 1/2" LONG, GR 5
8	6636G	4	U-BOLT, 3/8" x 1-1/4" LONG
9	6743G	16	NUT, HH, 3/8", GR5
10	5638B	2	LATCH BAR SPRINGS, 5/8" x 7" LONG
11	4523G	4	BOLT, EYE, 3/16" x 1-1/2" LONG
12	6636G	8	NUT, HH, 3/16", PL, GR5
13	6743G	16	NUT, HH, 3/8", GR5
14	3300G	2	WASHER, FLAT, 5/8"
15	4014B	2	SPRING, 1/4" x 8" LONG, D1157
16	4559G	2	BOLT, HEXHEAD, 5/8" x 9" LONG
17	4769G	4	NUT, HH, 5/8", PL, GR5
18	3310G	2	WASHER, LOCK, 5/8"





NOTES:
1. ADJUST AND TIGHTEN ITEM 9 TO ALLOW THE LATCH BAR TO OPERATE SMOOTHLY AND EASILY.
2. TIGHTEN SECOND ITEM 9 TO ACT AS A JAM NUT FOR THE U-BOLTS.
3. INSTALL THE EXTRA SHEAR BAR BOLTS IN THE HOLES PROVIDED IN ITEM 1.
4. USE EXTRA NUT (ITEM 12) TO ACT AS A JAM NUT ON THE SPRING EYEBOLTS.
5. WHEN ASSEMBLING ITEMS 14-18, BOTTOM THE FIRST NUT ON THE BOLT USE THE SECOND NUT AND LOCKWASHER TO SECURE THE BOLT.
6). INSTALL WASHER UNDER BOLT HEAD.

REV	BY	DATE	REVISION
D	BT	3/28/08	REVISED LENGTH OF ITEM 7 & PN OF ITEM 5
C	LH	6/07/07	REVISED TITLE BLOCK/CHANGED PART NO.
B	BJ	5/20/03	CHANGED ITEM PC NUMBER

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DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1
ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY,DALLAS, TEXAS

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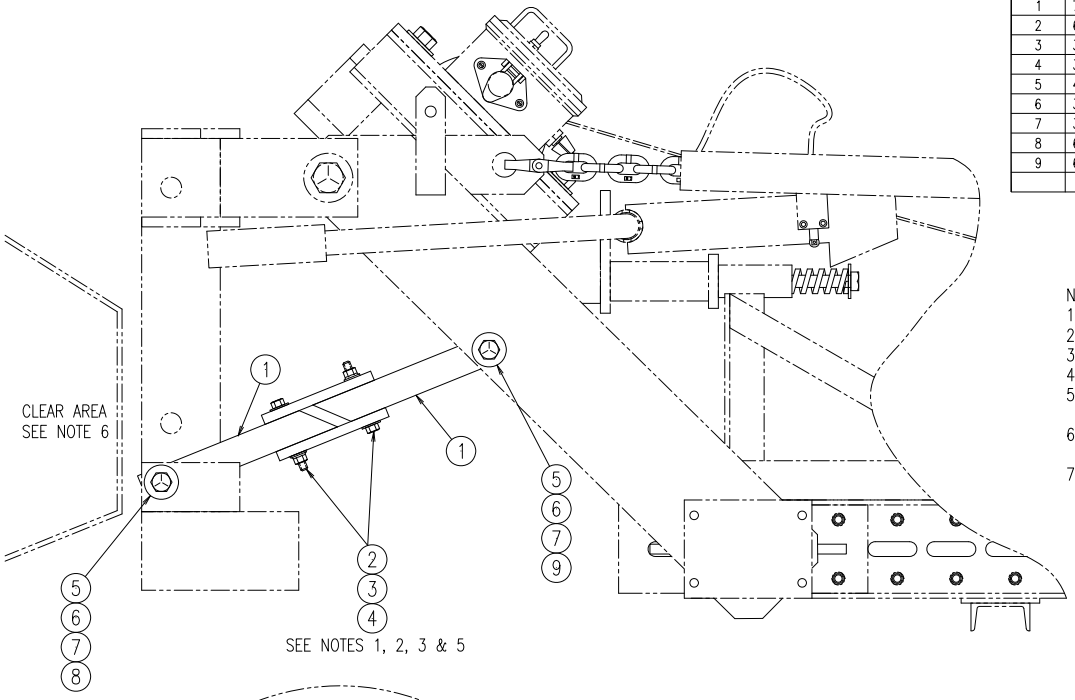
DRAWN	BJ	4-24-03
CHKD	BJ	4-24-03
APPD	JRA	4-25-03
ITMCLS	MPS	
NLA	959B	
WEIGHT	34.7 LBS	

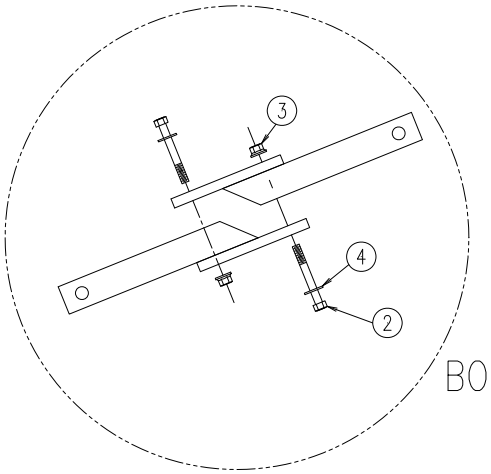
LATCH BAR INSTALLATION AND ASSEMBLY

DRAWING NO: 33598/SS620 | SHEET 1 OF 1 | REV D | SIZE D

PARTS LIST			
ITEM	PART NO.	QTY	DESCRIPTION
1	7507B	4	SHEAR BAR WELDMENT
2	6078B	4	SHEAR BOLT, HH, 3/8-16" x 3 1/2" LONG, GR 5
3	3257G	4	FLANGE NUT, 3/8
4	3051G	4	WASHER, FLAT, 3/8"
5	4769G	4	NUT, HH, 5/8", GR5
6	3300G	4	WASHER, FLAT, 5/8"
7	3310G	4	WASHER, LOCK, 5/8"
8	6829G	2	BOLT, HH, 5/8" x 4" LONG, GR5
9	6824G	2	BOLT, HH, 5/8" x 4 1/2" LONG, GR5



NOTES:
1. SHEAR BAR AND BOLT ORIENTATION THE SAME ON BOTH SIDES.
2. TORQUE ITEMS 2 AND 3 TO 35 POUND FEET OF TORQUE.
3. INSTALL ALL BOLTS DRY TO OBTAIN THE CORRECT TORQUE VALUES.
4. INSTALL THE MOUNT BOLTS (ITEMS 8 AND 9) AS SHOWN.
5. THE SHEAR BARS MUST BE INSTALLED AS SHOWN FOR CORRECT OPERATION.
6. THERE NEEDS TO BE A CLEAR ZONE AS SHOWN FOR THE SHEAR BARS TO MOVE WHEN THE UNIT IS IMPACTED.
7. THE LONGER 5/8" BOLT (ITEM 9) MOUNTS IN THE BRACKET HOLE.



BOLT ORIENTATION IN BARS

REVISIONS			
NO.	BY	DATE	REMARKS
B	LH	6/12/07	REVISED TITLE BLOCK
C	BT	3/28/08	REVISED PN & QTY OF ITEMS 3 & 4, REVISED QTY OF ITEM 2

TOLERANCES: UNLESS OTHERWISE SPECIFIED ON THIS DRAWING THE FOLLOWING TOLERANCES SHALL APPLY. SEE TRINITY STANDARDS FOR ADDITIONAL TOLERANCES. FRACTIONS MACHINED ±1/64" (.016") ALL OTHERS: (1" to 2')±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2" DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1 ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

TRINITY HIGHWAY PRODUCTS, LLC.
2525 STEMMONS FREEWAY, DALLAS, TEXAS

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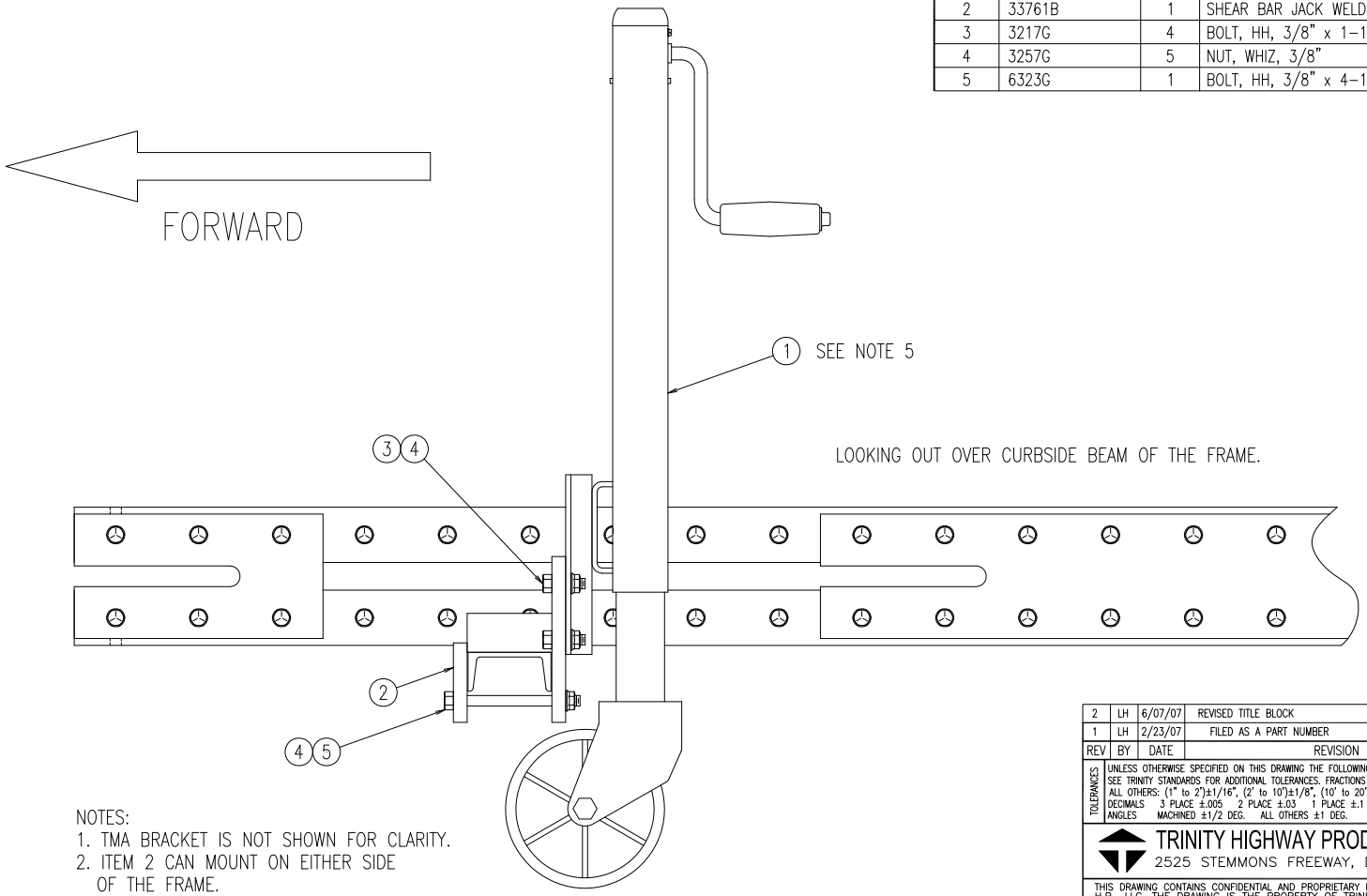
DRAWN	BJ	1-15-03
CHKD	BJ	1-15-03
APPD	JRA	4-25-03
ITMCLS	MPS	
NLA	959B	
WEIGHT	36.6 LBS	

SHEAR BAR INSTALLATION

DRAWING NO: 33599 / SS621

SHEET	REV	SIZE
1 OF 1	C	C

PARTS LIST			
ITEM	PART NO.	QTY	DESCRIPTION
1	5678B	REF	STORAGE JACK
2	33761B	1	SHEAR BAR JACK WELDMENT
3	3217G	4	BOLT, HH, 3/8" x 1-1/2" LG
4	3257G	5	NUT, WHIZ, 3/8"
5	6323G	1	BOLT, HH, 3/8" x 4-1/2" LG



LOOKING OUT OVER CURBSIDE BEAM OF THE FRAME.

NOTES:
1. TMA BRACKET IS NOT SHOWN FOR CLARITY.
2. ITEM 2 CAN MOUNT ON EITHER SIDE OF THE FRAME.
3. ITEM 2 AND HARDWARE IS AVAILABLE AS A KIT, PRODUCT CODE 33779B.
4. DO NOT LEAVE THE JACK ASSEMBLY BOLTED TO THE FRAME WORK AFTER SHEAR BAR REPAIR OR INSPECTION
5. ITEM 1 IS SUPPLIED WITH MPS.

REV	BY	DATE	REVISION
2	LH	6/07/07	REVISED TITLE BLOCK
1	LH	2/23/07	FILED AS A PART NUMBER

TOLERANCES: UNLESS OTHERWISE SPECIFIED ON THIS DRAWING THE FOLLOWING TOLERANCES SHALL APPLY. SEE TRINITY STANDARDS FOR ADDITIONAL TOLERANCES. FRACTIONS MACHINED ±1/64" (.016") ALL OTHERS: (1" to 2")±1/16", (2' to 10')±1/8", (10' to 20')±1/4", (OVER 20')±1/2" DECIMALS 3 PLACE ±.005 2 PLACE ±.03 1 PLACE ±.1 ANGLES MACHINED ±1/2 DEG. ALL OTHERS ±1 DEG.

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DRAWN	BJ	8-02-03
CHKD	BJ	3-15-04
APPD	BT	3-15-04
ITMCLS	MPS	
NLA	959B	
WEIGHT	15.4 LBS	

SHEAR BAR JACK ASSEMBLY AND INSTALLATION

DRAWING NO: 33779 / SS299 | SHEET 1 OF 1 | REV 2 | SIZE C

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